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ABSTRACT

This book contains a review of the 1994 Fulbright-Hays Seminars Abroad Program along with lesson plans from 13 of the participants. The curriculum projects contained in this book include: (1) "The Brazilian Cinema: A Critical Appreciation of An Industry in Turmoil" (Aaron Braun); (2) "Reflections on the Relationship between Brazilian Communities and the Environment" (John G. Clark); (3) "A Program for Freshmen Library Orientation on the Country of Brazil" (Susan B. Coppola); (4) "Brasil" (Brian Fitzpatrick); (5) "The Photography of Workers in Brazil" (Howard M. Fraser); (6) "A Photographic Assessment Reflecting the Degradation of the Atlantic Rainforest of the Serra do Mar, Cubatao, Sao Paulo, Brazil" (Gordon F. Kells); (7) "Project Report" (Nancy Mandlove); (8) "One Man, One City, Problems and Solutions: Jaime Lerner and the Curitiba Program for the Environment" (David McCullough); (9) "Measuring Quality of Life in Brazil" (Rachel A. Nugent); (10) "Using the Fundamental Themes of Geography to Examine Brazil" (Linda Reeves); (11) "Bahian Babbling about Brazil: A Curriculum Unit on 'Brazil and Biodiversity'" (Curtis L. Thompson); (12) "Think Globally-Act Locally: Environmental Issues in Brazilian Society" (Ruth E. Tottle); and (13) "Selected Sites of Environmental Concern in Brazil: An Overview" (Shirley M. Valencia). Most papers contain references. (EH)

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FULBRIGHT-HAYS SEMINARS ABROAD PROGRAM

ENVIRONMENTAL ISSUES IN BRAZILIAN SOCIETY

JUNE 26-JULY 31, 1994

This seminar was administered for the U.S. Department of Education by the Commission for Educational Exchange Between the United States and Brazil (Fulbright Commission)

**Comissao Fulbright
Edificio Casa Thomas Jefferson
SHIS QI-09, Conj. 17, Lote L
71625-170 Brasilia, DF, Brazil**

**Tel: (061) 248-7405
Fax: (061) 248-7359
E-mail: FULBSB@CR-DF.RNP.BR**

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U.S. DEPARTMENT OF EDUCATION SUMMER SEMINAR ON ENVIRONMENTAL ISSUES IN BRAZILIAN SOCIETY- 1994

BRASILIA PROGRAM

A) First Part: June 27-30

Accommodation: Hotel Aristus
Setor Hoteleiro Norte, QD 2, Bloco O
70.000 - Brasilia, DF
Tel: (061) 223-8675
Fax: (061) 321-5415

Sunday, June 26

22:30	Depart Miami via AA 905

Monday, June 27

08:13	Arrival in Rio de Janeiro (Terry V. McIntyre, Deputy Executive Director, will meet the group and accompany to Brasilia)
12:00	Proceed to Brasilia via RG 402
13:30	Arrival in Brasilia. Group will be taken to hotel
15:30	Group will have a brief city tour on the way to Prof. Marco Antonio's residence, where there will be an orientation on the seminar program, with the participation of Prof. Marco Antonio da Rocha, Terry V. McIntyre and Rejania Araujo
19:00	Get together (light meal) at Prof. Marco Antonio da Rocha - SHIN QI 16, conjunto 5, casa 21, tel. 577-4091
21:00	Return to hotel

Tuesday, June 28

08:20	Depart for Casa Thomas Jefferson (CTJ)
08:40	Introduction to Fulbright staff
09:00/ 12:00	Portuguese class

12:00	Lunch. (We suggest the CTJ self-service)
13:00	Roundtable discussion of research projects. (With the participation of Prof. José Maria Gonçalves de Almeida, Dept. of Ecology, University of Brasilia (UnB) and Prof. Tania Mara Botelho, Dept. of Science, Library, UnB. Each participant will brief the group on his/her project
14:00	Lecture on environment and development by Prof. José Maria Gonçalves de Almeida, UnB
15:15	Lecture on Brazilian economic scene, by Prof. Aercio Cunha, Dept. of Economics, UnB
16:30	Return to hotel
Evening	Free

Wednesday, June 29

08:40	Depart for CTJ
09:00/ 12:00	Portuguese class
Lunch	CTJ self-service
12:45/ 14:00	Lecture on Brazilian education, by Prof. Maria de Fátima Guerra de Souza, Director of Educational Extension Center, UnB
14:10	Bus departs for American Embassy, for briefings by American officers
	14:45-- Welcome by Ambassador Melvyn Levitsky 15:00-- Introduction (USIS)/Carl Howard, CPAO /Dennis Shaw, CCAO 15:20-- Political (John Cook) 15:50-- Economy (Sherry Villarosa) 16:20-- USG Envornmental projects/programs (EStoner)
17:00	Return to hotel
Evening	Free

Thursday, June 30

08:30	Bus departs for airport
10:00	Proceed to Cuiaba via RG 476

***NOTE:** It will not be necessary to take all your bags to the Pantanal. You'll be able to leave some at Aristus Hotel*

CUIABÁ/PANTANAL MATOGROSSENSE PROGRAM
June 30-July 4

Accommodation in Cuiabá	Paiaguás Palace Hotel Av. Rubens de Mendonça, 1718 78050-000 - Cuiabá, MT Tel. (065) 624-5353 Fax (065) 322-2910
Accommodation in Pantanal	Sapé Pantanal Lodge Address for contact Caixa Postal 2241 78020-970 - Cuiaba, MT Tel/fax (065) 361-4069 Tel/fax (065) 322-3426

Thursday, June 30

10.35	Arrival in Cuiaba on RG 476 from Brasilia. Proceed to Chapada dos Guimarães on chartered bus
Lunch	At Chapada
16.00	Return to Cuiabá. Check-in at Hotel Paiaguás
17.30	Discussion on environmental education/economic development with Prof. Clóvis Miranda, Federal University of Mato Grosso, Dept. of Agronomy.
Evening	Free

Friday, July 1

06.30	Check-out Paiaguás Palace Hotel
07.00	Depart Cuiaba for Pantanal Matogrossense (on chartered bus) via Poconé and Porto Cercado. From Cuiabá to Poconé (100 km - 60 miles - paved road) and from Poconé to Porto Cercado (42 km - 25 miles - unpaved road). In Porto Cercado (located in the Pantanal) the group will take a boat to the Sapé Pantanal Lodge (one hour and forty minutes boat trip on Cuiabá River.)
13.00	ETA Sapé Pantanal Lodge
Luncheon	At Sapé Pantanal Lodge

Saturday, July 2

Pantanal

Sunday, July 3

Pantanal

Monday, July 4

07:00	Check out Sapé Pantanal Lodge (right after breakfast). Return to Cuiabá
13:00	Lunch in restaurant near the airport
16:20	Depart to Brasilia via RG 477
18:55	Arrival in Brasilia. Group will be taken to hotel (by bus)

BRASILIA PROGRAM
A) Second Part: July 4-7

Accommodation Accommodation Hotel Aristus
Setor Hoteleiro Norte, QD 2, Bloco A
70.000 - Brasilia, DF
Tel (061) 223-8675
Fax (061) 321-5415

Tuesday, July 5

08:40	Depart for Casa Thomas Jefferson (CTJ)
09:00/ 12:00	Portuguese class
12:00	Lunch
13:30/ 15:00	Lecture on current Brazilian political scene, by Prof. David Fleischer, Dept. of Political Science, UnB
15:15	Return to hotel
17:15	Bus departs hotel for Terry McIntyre's residence
17:30	Churrasco (barbecue) hosted by Terry and Zeze, SQN 210, Bloco F, Apt. 501, tel. 272-4925
21:00	Return to hotel

Wednesday, July 6

08:40	Depart for CTJ
09:00/ 12:00	Portuguese class
12:00	Lunch at CTJ

12:30	Return to hotel
Afternoon	Activities related to research projects
Evening	Free

Thursday, July 7

10:00	Depart hotel for airport
11:30	Proceed to Carajás via RG 264

CARAJÁS PROGRAM
July 7-9

Accommodation Maxwell Hotel
Av. Trocara
Carajás, PA
Tel. (091) 328-1330
Fax (091) 328-1366

Thursday, July 7

13:25	Arrival in Carajás. Proceed to hotel
Afternoon	Program arranged by CVRD (Companhia Vale do Rio Doce)
20:00	Dinner hosted by CVRD at Hotel Maxwell

Friday, July 8

Morning	Program arranged by CVRD
13:00	Lunch hosted by CVRD (at the Company's restaurant)
Afternoon	Activities arranged by CVRD
20:00	Dinner hosted by CVRD

Saturday, July 9

Morning	Free
14:00	Depart for airport
15:35	Depart to Belém via RG 252

BELÉM PROGRAM
July 9-10

Accommodation
Hotel Regente
Av. Governador Malcher, 485 (Centro)
Tel (091) 241-1222
Fax (091) 224-0343

Saturday, July 9

16:45	Arrival in Belem. Proceed to hotel by bus
Evening	Optional activity (Dinner at Lá em Casa. Av. Gov. Melcher 247 - Centro Tel. 233-1212)

Sunday, July 10

Morning	Optional activities - Visit to Street market Ver-o-Peso (Praça Frei Caetano Brandão - Forte do Castelo - Visit to Museu Emilio Goeldi (Av. Magalhães Barata, 376 - Nazaré (tel. 224-9233, R. 223)
17:30	Depart hotel for airport
19:00	Depart for Manaus via RG 302

MANAUS PROGRAM
July 10-14

Accommodation
Hotel Amazonas
Praça Dr. Adalberto Vale (Centro)
Tel. (092) 622-2233
Fax: (092) 622-2177 / 622-2064

Sunday, July 10

20:55	Arrival in Manaus. Proceed to hotel by taxi

Monday, July 11

09:00	Group will be met by Profa Vera Caminha, Rector's Advisor, Federal Univ of Amazon, and Prof Dulce Alencar, Opera House Foundation, at the hotel, for a brief orientation on Manaus and a guided city tour and visit to museums
Evening	Optional activity (Dinner at Paramazon - Rua Sta Isabel, 1176, Cachoeirinha tel 233-7768)

Tuesday, July 12

09:00/ 16:00	Tour - Cruise on the Rio Negro and Rio Solimões **Note:** Everybody will go on this cruise, but those staying overnight in the jungle will return on Wednesday

Wednesday, July 13

	Activities related to individual research projects **Note** Those of you spending the night in the jungle will be returning this afternoon
Evening	Free

Thursday, July 14

Morning	Free
12:30	Depart hotel for airport
14:30	Depart to Salvador via RG 205/RG 270 (Connection in Brasilia)
19:35	Proceed to Salvador from Brasilia via RG 270

SALVADOR PROGRAM

July 14-18

Accommodation	Hotel da Bahia Praça 2 de Julho (Campo Grande) Tel (071) 321-3699 / 247-9922 Fax 321-9725

Thursday, July 14

21:15	Arrival in Salvador Proceed to hotel by bus

Friday, July 15

09:00	Orientation session on Salvador by Prof James Riordan at Associação Cultural Brasil-Estados Unidos (ACBEU) - Av Sete de Setembro, 1183 (Corredor da Vitoria). Tel 336-4411
10:00	Lecture on Brazilian popular art, by Prof Helena Laufer
Lunch	Suggested restaurant - Casa da Gamboa - Rua Newton Prado, 51 (Gamboa de Cima), tel 321-9776
Afternoon	Program arranged by Federal University of Bahia (UFBA), Prof Jorge Eurico, Dept of Water and Waste Management
Evening	Tentative "Candomblé" (optional activity)

Saturday, July 16

Morning	Optional activities Visits to Centro Histórico, Pelourinho, Mercado Modelo
Lunch	Optional at Mercado Modelo (Camaféu de Oxóssi)
Afternoon	Visits to Museu Costa Pinto (Av 7 de Setembro 2490, Vitória, tel 336-6081, 15/18 hrs) Museu de Arte da Bahia (Av 7 de Setembro 2340, Vitória, tel 336-9450, 14:30/18:30 hrs
Evening	Optional (Dinner at Solar do Unhão -- with live music/folckloric shows -- Av do Contorno - Gamboa - tel 321-5551

Sunday, July 17

	Free for individual interests Optional activities - Itaparica Island - Beaches - Schooner Cruise
Evening	Free

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Monday, July 18

Morning	Free
11:00	Depart hotel for airport by bus
13:10	Proceed to Curitiba via RG 301
15:15	Arrival in Rio de Janeiro
16:00	Proceed to Curitiba via RG 144
17:25	Arrival in Curitiba

CURITIBA PROGRAM
July 18-20

Accommodation Hotel Elo
Rua Amintas de Barros, 383 (Centro)
Tel/fax (041) 262-7131

Monday, July 18

17:25	Arrival in Curitiba. Proceed to hotel by bus
Evening	Free

Tuesday, July 19

08:40	Depart hotel for Universidade Livre do Meio Ambiente (Rua Victor Benato, 210 - Pilarzinho - Tel. 254-5548 / 254-7657)
09:00	Meeting with Prof. Cleon Ricardo dos Santos, Coordinator, Universidade Livre do Meio Ambiente
Luncheon	
14:00	City tour hosted and guided by State Secretariat of Tourism (Dr. Luiz Julio Zaruck, Head of the Secretariat/Leoni Luiz, Advisor Tel 223-3535)
Evening	Optional activity Dinner at Madalosso (Italian) with live music

Wednesday, July 20

07:30	Depart hotel to airport
09:05	Proceed to Foz do Iguaçu via RG 169

FOZ DO IGUAÇU PROGRAM
July 20-21

Accommodation Hotel das Cataratas
Rod. das Cataratas, Km 28
Tel (0455) 23-2266

Wednesday, July 20

10:15	Arrival in Foz do Iguaçu Proceed to hotel
Lunch	Free (At the hotel)
Afternoon	Visit to Cataratas
Evening	Free

Thursday, July 21

07:30	Depart hotel for Visitors Center of Itaipu Binacional
07:50	Video presentation "Man and Environment" (30 min)
08:30	Visit to "Refúgio Biológico Bela Vista"
08:45	Visit to "Forestal Vivarium, Fauna and Reforestation Sector
10:00	Visit to Itaipu Dam (Barragem, Mirante da margem direita e Projeto Expirmental Canal de Migração para desova de peixes)
11:00	Visit to Ecomuseum and discussion with with technicians from the Superintendência do Meio Ambiente
Lunch	Free
16:00	Depart to São Paulo via RG 250
17:35	Arrival in São Paulo

SÃO PAULO PROGRAM
July 21-24

Accommodation
St. Germain Hotel
Rua Padre João Manoel 202
Jardim Paulista
01411 - São Paulo, SP
Tel. (011) 883-2488
Fax (011) 883-2476

Thursday, July 21

17:35	Arrival in São Paulo
Evening	Optional activity Free

Friday, July 22

08:45	Depart for Secretariat of Environmental Affairs of São Paulo State Itaim Bibi, Rua Tabapuã, no 81 Tel. 822-8805, 822-2766 R. 2766 / 2470
09:30	Meeting with Dr. Edis Milaré, Secretary of Environment of São Paulo Video presentation (institutional)
11:00	Visit to CETESB (Companhia de Tecnologia e Saneamento Ambiental) Video presentation Technical explanation on Cubatão Visit to laboratories, library and telemetric station
Lunch	Hosted by CETESB
14:30	Visit to Instituto Florestal (to be defined)
Evening	Optional activity Dinner at Bexiga (Italian neighborhood) - Cantina Roperto (Rua 13 de maio, 634 / Tel. 288-2573) - Bela Vista - La Tavolla (Rua 13 de maio, 621 / Tel. 288-5673) - Bela Vista

Saturday, July 23

Free for individual research projects

SANTOS PROGRAM
July 24-25

Accommodation

Mendes Panoroma Hotel
Rua Euclides da Cunha, 15
Tel. (0132) 37-2627
Fax (0132) 4-8253

Sunday, July 24

08.30	Depart for Santos via Paranapiacaba (Serra do Mar), Estação Ecológica (University of Sao Paulo) and Cubatão (Chartered bus). Group will accompanied by one representative from Secretaria do Meio Ambiente and one from CETESB Overnight in Santos

Monday, July 25

08.30	Chartered bus departs Santos for Volta Redonda

VOLTA REDONDA PROGRAM
July 25-26

Accommodation

Hotel Bela Vista
Alto Bela Vista
Volta Redonda
Tel. (0243) 43-2022

Monday, July 25

18.00	Arrive Volta Redonda
20.00	Dinner at Bar do Batata, Barra Mansa

Tuesday, July 26

Morning	Visit to CSN - Companhia Siderúrgica Nacional -- cancelled
Lunch	Hosted by CSN -- cancelled
13.30	Depart for Rio de Janeiro
15.30	ETA Rio de Janeiro

RIO DE JANEIRO PROGRAM
July 26-31

Accommodation: Hotel Everest Rio
Rua Prudente de Moraes, 1117
Ipanema
Tel. (021) 287-8282

Contact: Fulbright Office
Av. Nossa Senhora de Copacabana 690/12o
Tel. (021) 236-3187
Fax (021) 255-4398
E-mail FULB@BRLNCC.BITNET

Wednesday, July 27

09:00	Orientation session on Rio de Janeiro with the participation of USIS represtnative (at the hotel)
09:30	History of Rio de Janeiro City (Prof. Jaime Benchemol, Oswaldo Cruz Foundation)
11:00	Geography, History and Economy of Brazil (Profa. Bertha Becker, Federal University of Rio de Janeiro)
Luncheon	Free
13:30	Visit to State Park da Pedra Branca. Assisted by Axel Smith Grael, president of the Forest State Institute, linked to the State Secretary of Environmental Studies
18:00	Meeting with the National Secretary for Environmental Affairs and President of Instituto Brasil PNUMA, Dr. Haroldo Mattos de Lemos (at the hotel)
Evening	Free

Thursday, July 28

08:30/ 13:00	Visit to the Favela of Rocinha
Lunch	Free
Afternoon	Activities to be arranged (ONG - Non-Governmental Organization)
Evening	Free

Friday, July 29,

09:00	Debriefing session (at the hotel)

Lunch	**Free**
Afternoon	**Free for pursuit of individual research projects**

Saturday, July 30

Free	Optional activity - Tour of Corcovado/Pão de Açúcar

Sunday, July 31

Free

20.00	Bus departs hotel for the airport
23.00	Depart Rio de Janeiro for Miami via AA 904

Monday, August 1

05.46	Arrival in Miami

* * * * * *BOA VIAGEM* * * * * *

June 22, 1994

Useful contacts:

Marco Antonio da Rocha
SHIN - QI 16, conjunto 5, casa 1
Lago Norte - Brasilia
Tel: (061) 577-4091

Terry V. McIntyre
SQN 210, Bloco E, Apto. 501
Brasilia
Tel: (061) 272-4925

Rejânia Araujo
SML - Conjunto 12, Casa 3
Setor de Mansões Samambaia
Taguatinga, DF
Tel (061) 351- 7014 / 563-6709

Nilza Waldeck
Rua Prof. Arthur Ramos, 48/201 - Leblon
Rio de Janeiro, RJ
Tel: (021) 294-2887

PARTICIPANTS IN THE SEMINAR

Note: Sixteen participants were selected for the seminar, but only 14 completed the program. Ms. Pamela Newman was forced to withdraw at the last minute because of family reasons. Mr. John Jurva began the program but had to return to the U.S. because of an injury he suffered at Carajas.

Participants	Business Address	Home Address
1. Mr. Aaron Braun	South Shore High School 6565 Flatlands Avenue Brooklyn, NY 11236 Tel: 718-531-4454, Ext. 250	785 Ocean Parkway, Apt 3H Brooklyn, NY 11230 Tel: 718-434-7740
2. Mr. John G. Clark	Department of History University of Kansas Lawrence, KS 66045 Tel: 913-864-3569	3411 Seminole Drive Lawrence, KS 66047 Tel: 913-842-1872
3. Ms. Susan Coppola	Canton High School 900 Washington Street Canton, MA 02021 Tel: 617-821-5050	130 Moss Hill Road Jamaica Plain, MA 02130 Tel: 617-522-9148
4. Mr. Brian Fitzpatrick	Jefferson County Open School 7655 West 10th Avenue Lakewood, CO 80215 Tel: 303-233-4878	29571 Fairway Drive Evergreen, CO 80439 Tel: 303-674-7061
5. Mr. Howard M. Fraser	Department of Modern Lang. College of William & Mary Williamsburg, VA 23187-8795 Tel: 804-221-3691	253 Tyler Brooks Dr. Williamsburg, VA 23185 Tel: 804-229-0758
6.Mr. Jon K. Jurva	Francis W. Parker School 330 West Webster Chicago, IL 60614 Tel: 312-549-0172	1834 North Orleans Chicago, IL 60614 Tel: 312-649-1003
7. Mr. Gordon F. Kells	Department of Geography Mott Community College Flint, MI 48501 Tel: 313-232-2354	2515 Windmere Flint, MI 48503 Tel: 313-235-1730

8. Ms. Nancy B. Mandlove	Latin American & Caribbean Studies Wofford College Spartanburg, SC 29303-3663 Tel: 803-597-4000	3603 Sherwood Drive Spartanburg, SC 29302 Tel: 803-573-6433
9. Mr. David J. McCullough	Dept. of History & Sociology West Shore Community Col. Scottville, MI 49454 Tel: 616-845-6211	2879 N. Canal Street Ludington, MI 49431 Tel: 616-845-5365
10. Ms. Pamela A. Newman	Horizon High School Thornton, CO 80601 Tel: 303-45-5227	790 South Washington Denver, CO 80209 Tel: 303-733-7102
11. Ms. Rachel A. Nugent	Department of Economics Pacific Lutheran University Tacoma, WA 98447 Tel: 206-535-7598	82 Salmon Beach Tacoma, WA 98407 Tel: 206-756-9457
12. Ms. Linda A. Reeves	Redlands Middle School 2200 Broadway Grand Junction, CO 81503 Tel: 303-245-6084	Recently moved: address unknown, but still in Grand Junction
13. Mr. Emilio A. Rodriguez	Dept. of Political Science Mount Saint Mary's College Emmitsburg, MD 21727-7799 Tel: 301-245-6084	113 Artillery Drive Gettysburg, PA 17325 Tel: 717-334-4107
14. Mr. Curtis Thompson	Department of Religion Thiel College Greenville, PA 16125 Tel: 412-589-2000	19 Shady Avenue Greenville, PA 16125 Tel: 412-588-9580
15. Ms. Ruth E. Tootle	Pickaway-Ross Joint Vocational Center Chillicothe, OH 45601 Tel: 614-642-2550	12072 Egypt Pike Clarksburg, OH 43115 Tel: 614-993-2102
16. Ms. Shirley Valencia	Dept of Natural Sciences Butte College Oroville, CA 95965 Tel: 916-895-2531	3830 Bartlett Avenue Rosemead, CA 91770 Tel: 818-280-1454

BRAZILIAN JOURNAL

The journal entries were voluntary on the part of the participants. Each member was assigned certain days to write a report on the day's activities. The journal is incomplete because some of the members of the group did not prepare daily reports.

Brazilian Journal
June 26, 1994 - July 31, 1994

Sunday, June 26, 1994

I left Fort Myers Beach about 4:00 p.m. to drive to Miami International to meet my fellow Fulbright scholars. Upon arriving at the airport, I attempted to exchange money, as per our instructions from Terry, but was informed that American banks were not exchanging any more Brazilian money until the reals were in circulation. I headed for the international section of the airport to meet the other member of my new family. Dave and Gordon were the only two to arrive ahead of me, and Dave and I were the only two who followed the instructions and actually wore the name tags which identified us as members of an elite group of educators headed for Brazil. Somehow, as the others already knew, and as Dave and I quickly realized, we didn't need the name tags at all. Except for Jon Jurva, who was younger than the rest of the crew by several years, we had the look of American touristas off to see the wizard -or at least to follow the leader (Terry), around Brazil. While waiting to board the plane, Dave, Gordon and I had a lengthy conversation with a Brazilian teenager from Belo Horizonte, Ferdinanda, who had spent a year in Jackson, Michigan as an exchange student. She was a very interesting young lady who pointed out some cultural similarities and differences between the U.S.A. and Brazil for us. Dave and I debated about eating a bite of food and decided to wait for dinner which we thought was only two hours away. Wrong! In the meantime, we amused ourselves by evaluating everyone who descended the escalator. Were they or weren't they one of us? We actually became quite adept at this little exercise, but our numbers were off. Pam, as we found out later, was never able to join us and Brian had trouble getting to Miami and joined us a couple of days later in Brasilia. So the group numbered only 14, not 16.

Our plane was scheduled to take off at 11:05 p.m. but shortly after boarding, we all noticed a noxious odor that gave several of us headaches. The odor turned out to be caused by a substance of unknown composition leaking in the baggage compartment. American decided to have us deplane while they checked out the odor. At first we were told to leave everything on board, but eventually, we changed planes altogether. Back on board a new plane at 2:00 a.m., we were on the runway ready for flight, when once more we had to return to bay to check the luggage. Finally, about 3:00, we began our flight to Rio. By this time many of the group slept through dinner, but a few of us ate dinner about 4:00 a.m. after watching Miami disappear into the night. Breakfast was served about 11:00 a.m. and we landed in Rio about 1:00. Watching the landscape change below us, we were given a glimpse of the varied geographic faces of this wonderful country, the rainforest, the cerrado, the catinga, the hills, plains and mountains of Brazil. I never got tired watching the landscape change as we flew over Brazil in the

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next month. Perhaps only from the air can you really grasp the vastness and beauty of the country and realize the extent to which man had altered nature.

After greetings from Terry and Zeze, we learned that we had a little time to kill before our rescheduled flight to Brasilia at 4:00. Of course, we took advantage of the time to begin shopping and sampling Brazilian food. Brazilian CD's and tapes, postcards and stamps, T-shirts and books were the "hot items" of the day, including the bestseller, "How To Be a Carioca" which most of managed to read during the ensuing month before ending our journey back in Rio. Several of us had our first taste of pizza, Brazilian style, and guarana, a favorite Brazilian soft drink. Others experienced their first- but certainly not their last- bottle of Antarctica, our favorite Brazilian cerveja. We also had our first experience with Brazilian monopoly money. We had been unable to exchange dollars for cruzeirps in Miami due to the anticipated switch to reals in a few days. Terry's advice, which we followed, was to exchange only $20 to $50 until the new currency was in circulation.

Boarding our first flight on Varig, the Brazilian airline, we were quite impressed by the quality of service and food. This impression was reinforced with each flight. We arrived in Brasilia about 5:30, meeting Marco Antonio and Regenia at the airport. After checking into the hotel Aristus, we dined at Marco Antonio's home. What was described as a "light meal" in our program schedule was actually a feast prepared by Ione, Marco Antonio's wife. We also met his children, Bruno, who had just returned from a year in the states as an exchange student in Louisville, Ky. and his daughter, Luciana. We were given a tour of the house and grounds which included a lovely pool with tile floor. Appetizers included pickles, olives, cheese, artichokes, and drinks. We were introduced to cachaca, Brazilian rum which can be served in a variety of ways. Dinner was pasta with three varieties of sauces - each delicious- salad and bread, with wine and coffee. I can't remember what was served for dessert since I was too full to eat any. We met Percilia Santos and Janda Cunha who were to try to teach us some Portuguese in the next few days. They did try, but some of us proved to be slow learners. A lesson in humility for those of us who thought we were pretty smart cookies. Our first evening in Brazil was lovely with good food and excellent company in a beautiful, though not typical, Brazilian home. Going over the itinerary with Terry after dinner, we were tired but eager to begin our adventures in Brazil.

Ruth Tootle

Brasilia
June 28, 1994

The group rises early to eat breakfast at the hotel. We learn quickly that Brazilians love to eat. Breakfast consists of coffee, tea, orange juice, hard rolls with ham and cheese or crackers and cheese, and a variety of fruits, usually watermelon, papaya, melons and oranges. The breakfasts at this hotel, which I think are more than adequate, actually turn out to be very modest in comparison with meals served in other hotels. After breakfast, we board the bus for Casa Thomas Jefferson (CTJ) to be introduced to the Fulbright staff and to have our first Portuguese class. Having been urged by Terry to try the advanced class, I stay for all of fifteen minutes before heading for the beginning class. I knew after five minutes I was out of my league, but it took ten more minutes before I could summon the courage to bid adios to Jonda and those of us with some language skills. Greeted by catcalls and jeers when I joined the second class, I knew immediately that here were language students more to my liking. I won't go into what happened in our class because John has already described it eloquently in his entries, but I would like to say that I did learn something of the language and culture of Brazil, but probably not nearly as much as I should have. I was reminded of Kotter and his sweathogs and felt a great affinity for some of my remedial students.

After struggling with language class, we ate lunch at CTJ in the self-service cafeteria. Once again we were served a generous lunch. It seems that Brazilians eat rice and beans with every meal. For a very reasonable price, we were served a main entree, rice, beans, and a variety of other vegetables.

After lunch and distribution of our first allowances, we were joined by Brian Fitzpatrick and had a roundtable discussion of our projects. Professors Almeida and Botelho gave several of the group helpful suggestions, as did Marco Antonio. Contacts in Brazil were suggested for several of the group.

After a very informative lecture on the Brazilian economy by Prof. Aercio Cunha, we adjourned to Carpe Diem, a popular watering hole, to watch the soccer match between Sweden and Brazil. The Brazilians eyed Jon Jurva suspiciously thinking he might be Swedish. Except for a few choice words, which we understood perfectly despite our inadequacies in language class, nothing happened. After a couple of beers (Skol), fries, smorgasbord, chicken and salsa and steak and gravy, we joined in the singing, flag waving, dancing, drinking and shouting that accompanied every soccer match we watched. These Brazilians are crazy about soccer. Never again will I think that Ohio State and Michigan fans have a lock on outrageous fan behavior. They are amateurs in comparison with our friends in South America. Unfortunately, this game ended in a tie but the celebrating still went on all night. One interesting thing to me was the fact that families, including very small children, came to the tavern together.

In the states, the children usually do not accompany the parents at night when liquors are being consumed in mass quantities. Nancy, Linda and I bought flags and had the Brazilians autograph them after the match. Most of the group walked over to the shopping center on our return to the hotel to purchase aqua mineral and ice cream. Some also had their first experience with the churrasco, but some of us called it a night and returned to the hotel to write, read and sleep. Shirley, of course, had to wash out some clothes and hang them about our room. I'm certain she is part Chinese, right Shirl?

Ruth Tootle

June 29, 1994

The joyful camaraderie developing was perpetuated and strengthened when we reached Casa Thomas Jefferson and confronted a Brasilian police form. Were it not for the emerging collegiality of the group, the cooperativeness, the willingness to share information, the ability to laugh at each other's feeble jokes, the forms would not have been so successfully completed. Having overcome such bureaucratic impedimenta, the group divided into two classes to study Portuguese; one, the smarties, knew at least some Spanish; the other, the dummies, claimed marginal literacy in English. What went on in the rapid advancement group is a mystery to me. What transpired in the dummy class, to which this humble chronicler belonged, was equally mysterious. Our teacher was superb, a patient and intelligent person. But she was assigned the impossible task of instructing instructors. *"Bom dia, meus amigos, comm vai...tudo bem...?;" "obrigado(a)!"*, necessitated the summoning of vast mental energy in the "slow" class before such a challenging concept was perfectly mastered. One might say that *"meu cerebro aquece demais,"* or words to that effect. The mathematics of telling time took its toll, as Donne predicted, as did the ideal of ordinal, cardinal, positive, negative, mixed, partial, and non-quantifiable numbers. Miracle of miracles, we all emerged capable of responding politely, if inaccurately, to our wonderful Brasilian hostesses.

Following a session on Brasilian education in which we learned that the system is in the safe-fail mode, we were transported to the American Embassy to be welcomed by the Ambassador. Speakers then appeared. One, who earned the approval of this critical assemblage, represented AID. His presentation focused on the urgent need for local participation in development decisions. His analysis pinpointed the role of Brasilian elites in siphoning off benefits from development projects. How often that theme turned up, like a bad penny, as we moved across the Brasilian landscape.

Finally, the afternoon of lectures concluded. Some of the group, including this objective observer, took advantage of Marco Antonio's invitation to attend a concert at Casa Thomas Jefferson. This performance summarized over a century of development in Brasilian music. All attending were mesmerized by the beauty of the sounds created by the two performers. The concert concluded appropriately, for me, with a rendition of "a day in the life of a fool."

Those who missed this wonderful experience are probably sad, and deservedly so. They probably spent their time gorging themselves in one of Brasilia's numerous culinary hotspots, or traipsing around the post-modern hypermarche not far from our modest hotel.

As this day ended, all anxiously awaited the marrow and the commencement of our Pantanal adventure.

John G. Clark

Journal June 30

Seven o'clock comes too early this morning. Nancy and I chatted until 2:30AM followed by an almost sleepless night. Setting off on another adventure is too exiting or is it the thought of paying our refrigerator bill??

The scene at the airport resembles all group departures: Curt's turn to look for his ticket. Terry manages to keep us moving toward the plane with warnings about no reserved seating. We flood the front rows of the plane on our way to Cuiaba. American tourists abroad!

The land from Brasilia to Cuiaba looks flat and dry.

Shirley shoots pictures the entire hour and a half.

Lunch arrives a half hour into the ten o'clock flight, a visual treat of fruit and skewered meats. Big John claims this is the best meal in Brazil.

Cuiaba airport was hot 86; quite a change from the 60's and 70's of Brasilia. Little John finally finds postcards.

Terry and Zeze made sure the airport shopkeeper treats us fairly. Change is a nightmare. No shop has any.

Cuiaba is a large spread out city with many high risers.

Shops along the route in are very barren - a small bike or a few towels in the windows. The city has an unfinished, raw feeling, a mix of modern and poor.

Spirits are very high for our trip to the Pantanal. Most of the fearless 15 have yet to draw a breathe. Rejania and her husband Josef are along for the adventure. Shannon is with us full time.

The heat drove us to our hotel early to change into shorts and T-shirts. The hotel is a thirteen story modern building. Everyone is aboard the bus except Aaron. He is missing.

Our guide Luiz is the co-owner of Sape Lodge in the Pantanal. He quickly wins us over with free baseball hats and ice cold mineral water. Aaron returns with a claim of being in the shower. Boy is he all wet.

Off to the Chapado dos Guimaraes with a luncheon stop a lovely country restaurant. The local cachaca drink made from sugar cane, roast side of pork and thriteen other dishes are quickly consumed by a loud and jovial group.

Our next stop is a panoramic view from a look out 800 meters high. The valley, cattle ranches, farms, and forests stretch out before us. Several small fires are burning in the distance. A short drive opens another natural beauty, a [illegible]00 foot waterfall called Maiden's Veil, Veu da Nova. There is no time to hike down to the pool below, but do we take pictures. Rejania joins the photographers carrying a green

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coconut stuck with a straw purchased at a small hut beside the bus. Fifteen thirsty travelers each part with 2500 cruzeiros to sip this tropical delicacy, followed by another half hour of pictures. Dave really likes to have his picture taken.

Our last stop is at a park to take pictures of the surrounding red limestone rock formations, not unlike Sedonia Arizona. The shapes are high and flat with some cylindrical peaks, curiously eroded by nature. Our birder, Nancy, spots two large parrots with yellow bellies and a pair of macaws. A walk along a small creek leads to another small waterfall.

A young quite inebriated Brazilian girl with a black eye strikes up a conversation with the men. Two other young girls flood me with questions about the United States and our hotel. Fortunately, I forget the name of the hotel. This country of contrasts.

The ride back took us by small homes, many 12X12, mostly of brick without indoor water, quite a subsistent life style. Roads around the houses are unpaved.

A splash of water to the face and up to the 13th floor to hear Professor Clovis Miranda, a Fulbright scholar who studied at Tufts. This sincere man is of mixed Indian and white blood, an outcast from his own family. He stresses the importance of looking at the environment together with the people inhabiting it and to base changes starting with the values and goals of the inhabitants. Our group listens intently to this man of great knowledge and dignity.

[illegible]th and I try to take a swim in the pool but the water is too cold to do more than wade. A lovely buffet supper is laid out in the second floor dining room; many of us ete our second large meal of the day which costs double what we were first told!

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After Professor Clovis Miranda's provocative lecture of last evening, we're all eager to journey off into the Pantanal Matogrossene and see a Brasilian landscape other than Brasilia's barren facades. We've already seen a couple of waterfalls near Chapada, and the prospect of the Pantanal's wildlife and indigenous people creates excited tension this morning.

Partly the tension is created by a semi-blackout that greets some of us as we head towards a darkened dining room for breakfast in the Paiaguas Palace Hotel. Some might consider this an ominous sign, but the optimists amongst us find it fairly romantic.

A 6:30 check-out is extended to 7:30, and, armed to the teeth with vitamin B1, Avon Skin So Soft, tons of deet and countless other pest-control paraphernalia, our bus takes leave of Cuiaba.

A brief stopover at the geodesic center of South America located in the city of Cuiaba provides Gordon (soon to be dubbed the "Jabaru,") with a geologist's wet dream.

It's a long bus ride, and as we stop for agua, ice cream and rest rooms at a desolate gas station enroute, we are enlightened as to the Brasilian phenomenon of the 'love motel,' inasmuch as one is within spitting distance of our stopover. Terry enjoys our reactions to his tongue-in-cheek description of these motels, and many photograph this otherwise non-distinct building while establishing an ever-growing curiosity about it.

Along the 60 mile paved road to Pocone, some emu, jabaru, and other wildlife are spotted and photographed, as well as our first encounter with a termite nest alongside the road. (Gordon had his euphoric moment earlier, and now it's Shirley's moment of glory as she sets up her shots meticulously.)

The 25 mile stretch of unpaved road into the Porto Cercado is a gloriously uncomfortable but fascinating jaunt. It is here that some of us, the "sweet-fleshed," are accosted by our very first mosquitos. The deets are hastily extracted and there is a flurry of desperate spraying and application in the back of the bus as some of us city folk begin to panic that the larium has not yet begun to take effect.

Crossing a dilapidated old bridge, we disembark in an area that is exquisite. It is here that we first sight the jacare and piranha that we will later see in abundance, but for the moment we are stupefied. Binoculars emerge from hibernation. The water is bristling with piranha as they feed just below the surface. It seems almost like a boiling cauldron, and we are collectively hypnotized. Our reverie is broker by the spotting of a mass of jacare sunning themselves along the riverbank, seemingly one atop the other. The birds too are everywhere. Nancy's ornithological expertise is realized by the group as she is able to extend our appreciation of the fowl by naming them for us.

Back on the bus, the experience can be likened to Henri Clouzot's *WAGES OF FEAR* wherein a group of adventurous mercenaries drive outdated trucks filled with nitroglycerin along similarly treacherous unpaved jungle trails. It is ferociously hot, muggy and loin-shatteringly bumpy....but we survive.

[NOTE: Although he isn't thus nicknamed as yet, Gordon Kells plants the seed for his future moniker, "The Jabaru," when, upon spotting this bird, Gordon is heard to heatedly yelp at the driver that he has stopped in the "wrong goddamn place," with a "goddamn tree" "blocking his goddamn lens sight!"]

[SECUNDO NOTE: as this is being transcribed long after its occurrence, one wonders in retrospect how "Proper" Sue from Boston perceived all of these "goddamned" profane utterances from her associate, or did she just blanch at four-letter words? . . . just wonderin'.]

At the Porto Cercado, we disembark and sun blocks emerge from their hibernation. Hats are donned as the midday sun taunts the pale pedagogues, and two twelve-seater launches transport us up the Cuiaba River for a 115 minute excursion to the Sape Pantanal Lodge.

Half-owner Luis rides with us as a third launch transports our baggage.

It is during this launch-ride upriver that disbelief begins to set in. . . The sights, sounds and sensations are truly breath-taking. Huston's *THE AFRICAN QUEEN* as well as all the Weismuller *TARZAN*'s are recalled as flocks of birds are spotted and alligators along the bank slither into Cuiaba in response to our motors. Under my breath, I mutter a heartfelt thanks to Master Fulbright, wherever he may be. It seems truly amazing to me that only days before I had been in urban Bwooklyn, a lifetime removed from what I was now witnessing and experiencing!

At 13:30 we arrive at the Sape Pantanal Lodge.

It is triple-occupancy, rustic and minimalist at the Lodge, but each of us is in tune with the distinctively remarkable experience this stay will be.

As soon as our bags are stored in our rooms, we set off in smaller launches out into the wonders of the Cuiaba. Cameras, film and deet are the requisites we bring along as we may be out 'there' into dusk, when, as part owner Richard informs us, all the flying critters are due to make their presence felt.

As the cliche has it, "words cannot describe" the sublime beauty of the various species of birds we encounter. Along with egrets, emu, and jabaru, Nancy points out the stately spoon-billed beauty that will account for many an exposed frame. Once again, the jacare is plentiful, and, with apologies to the late Richard Millhouse, we also spot the world's largest rodent, the capybara. We don't quite find the sought-for sea otter, but we nonetheless return to the lodge exhilarated. Our launch sputters and fails briefly, but it proves most advantageous when we are allowed to hear the cacophonous bird calls while the motor is silenced.

Back at the lodge there's not much to do but await dinner. Out on the porch that will provide hours of inane and provocative chatter over the length of our stay, the Fulbrighters get better acquainted. We also become acquainted with a Brasilian phenomenon that some would assert overshadows the Samba: the singular, sensational caipirinha! Both Terry and Richard, long-time aficionados, praise this concoction of cachaca, crushed lime and sugar as the only hope for a unified, content Brasil. [Weeks later, some of us may believe this!] Some eagerly partake of this new brew, other stick with agua or cerveja, and all the ills of the world are lost in the inebriated haze of jungle comraderie atop the porch.

Rachel, later to be monikered "Seattle Slew," "The Inquisitive One," or by her detractors, "Seattle Suck-Up," (A marathon four-hour discourse with Lungching Chiao in the Amazon wilds

affording this last christening, but we digress. . .) introduces a word game in which adverbs are acted out in a variation of charades. Fun is had by all as adverbs of varying degrees of difficulty are translated into mute caricatures delivered in varying degrees of thespian proficiency. It is during this lengthy game that Premiero John Clarke is acting out his particular adverb with extremely provocative and suggestive undulations, when Reverend Curt utters the infamous: "I don't know what the work is, but *I WANT YOU!!*"

A dinner of fried Bacu proves exquisite. The coffee is sublime, and some retire to the porch for another caipirinha session while others embark on a card game to end all card games. The rules, as described by the Ohio Hooch, are to this date unclear, but all who participate are content, albeit confused.

Before calling it a night, the porch provides the stage for an intriguing discussion on such topics as religion, messianic personages and epiphanies. Reverend Curt enamors his audience and we go off to bed placated.

Upon my return to my room, I discovered that my temporary roommate and beloved Portuguese maven, the Honorable Howard Fraser, has erected a makeshift 'wall of Jericho' out of clothesline and half a dozen freshly-washed BVD's that now looms between our beds. Assuring him that I had no amorous intentions and that he need not have gone to such extremes, we settle in.

[NOTE: During this overnight, Curt becomes the first of our casualties as the fried Bacu seems not to agree with him and he proceeds to evacuate the fish from various orifices all through the night.]

Aaron Braun

July 3

Today marks the end of our first week in Brazil, and fortunately we have a change of pace in the Pantanal, as much as in the intensity of activity as in its pace. Groups form to visit various sites including the birds' nesting areas upstream which we visited yesterday and the habitat of the great river otters [Port. ariranhas] downstream. While we wait for the boats to depart, Terry brings us up to date on some current events from beyond the Pantanal: The Colombian soccer player who inadvertently touched in a goal for the US has just been killed soon after returning home. The goalkeeper from Cameroon had his house burned down ostensibly for allowing 6 goals by Russia in their World-Cup match. Such sobering news comes in sharp contrast to the welcome sense of peace in this natural setting.

Upon their return we hear that the bird watchers have been treated to thrilling views of monkeys cavorting in the treetops, while those fishing for piranha have enjoyed great success, especially Emilio, whose performance has rivaled that of "the old man and the sea."

Some common species in English and Portuguese:

catfish: peixes de couro, barbado, bagre, pintado, surubim, Jau'
kingfisher: martim pescador
woodpecker: picapau
heron: garca
egret: garca branca, soco'
roseate spoon-bill: colhereiro cor de rosa
stork: jabiru, jaburu, tuiyuyu
wood stork: cabeca seca
howler monkey: bugio
swallow: andorinha
skimmer, river tern: gaivota

After lunch, we once again set out up river for fishing and bird-watching. Perhaps because it is Sunday, the river invites local families to explore the area, to fish or take journeys upstream on various kinds of vessels including a large tour boat, a ship which is also used to supply provisions such as ice, canned goods, etc. to residents along the riverfront.

We sail into several inlets and coves where numerous bird species nest [wood storks, pink spoon-bills, herons, etc.] Capybara are abundant and cavort in the marshes and along the riverbanks. Fishing is again favorable: Brian has hooked the son of Moby Piranha and Rachel has caught a champion catfish. Another splendid sunset lights our way back to the Sape' lodge. [Howard]

P.S. Howard gave me (Ruth) the credit for the catfish, but I had to be honest. All Aaron and I did was feed the piranhas and amuse our guides (and ourselves).

Howard Frazier

Brasilia
July 6, 1994

It was slow going this morning for a few--due to the cachaca session at the bar after Terry and Zeze's party last night. Instead of our scheduled Portuguese class, we had a tour of Brasilia with Janda and Persilia. It was our first opportunity to really see something of the city.

One of the most striking features of Brasilia is its modern architecture, which is found everywhere. We visited three churches this morning--each very different, but equally modern. Dom Bosco has a huge interior space surrounded by tall panes of blue and violet stained glass. The effect is very calming and peaceful. There are no images or saints--only a large, plain wooden crucifix over the alter. The church of Boa Voluntade is a kind of ecumenical New Age affair. You enter through a tunnel which opens into a large room with spiral markings of the floor--black and white. People walk the spiral without shoes and at the center they end under a large crystal open to light coming from the top. It's very peaceful. Other rooms have meditation space, plants and a waterfall. We also visited the Cathedral, which is another large, open space--full of light and somewhat austere. Just down from the Cathedral, there were men selling dried flowers of all shapes and colors. They had large, oddly shaped seed pods full of dried material that they used to make the flowers.

We stopped briefly at the monument to President Kubitschek. It was impressive, but there wasn't time to go inside. We went on to the Praca dos Tres Poderes--the government center. There is a vast open plaza with the executive building on one end and justice on the other. In front are two large twin towers of the congressional buildings and on the fourth side is the monument to freedom. The size and starkness of the plaza and buildings are powerful. Under the plaza there are drawings of the city plan and a mock-up of the city. Unlike many places in Latin America, the Plaza is not a center of activity, but a rather formal place--no vendors, no one sitting around, no noise or graffiti. There is a very large flag pole with a large flag--apparently a remnant of the military dictatorship and an object of some controversy--according to Janda.

Lunch at the university cafeteria and a brief tour. Buildings were closed because students were taking entrance exams.

After the tour, some of us faced the challenge of crossing the streets of Brasilia to go to the FUNAI store. In the evening, we had a great Italian dinner at Gordexo. [Nancy]

JOURNAL

JULY 7
BRASILIA TO CARAJAS

This was a day when we slept in. We left a ton of collected papers at the Casa Thomas Jefferson after being promised they would catch up with us in Rio. Then we boarded the bus to the Brasilia airport where we say the victorious Brazilian women's basketball team returning in triumph.

There was a really cute little girl on the plane that thought of us as real curiosities. She kept asking us to "speak English"; then laughed at our apparently poor attempts to do so. She even got down to that section of the plane where social Pariahs Aaron and Nancy were smoking something. We enjoyed the usual weel-prepared "prato" on the flight. Although I was unable to give away my allotment of cooked flesh. Just before we landed at Carajas, the Great Jaburu (our resident geographer) informed us that we were seeing our first real rain forest.

We deplaned into a breezy, balmy 88 degrees, at the C.V.R.D. airport where they had a marvelous old C-47 on display.

We got to spend about thrity minutes at the Maxwell Hotel yelling back and forth across our patios, then off to see a film produced by our hosts the C.R.V.D. explaining what a grnd company they are (in the literal sense), and how environmentally responsible they are at tearing up the landscape.

Then off to the C.V.R.D. Zoo under the care of C.V.R.D. P.R. agents (most of the women thought Claudio was really a nice guy... possibly because he looked good). At any rate, he did a good job of explaining the uses of several kinds of plants. The exhibits included a model of an 8000-year-old Indian site destroyed by the open pit mining operations. Next we entered a room with hundreds of specimens of bugs, beetles, and assorted other beasties. The naturalists among us went nuts taking photos through the glass drawers. Outside, there was an asssortment of very active monkeys (mostly spider and howler) and some big, lazy cats. A flight of Scarlet Macaws flew over us... Lots of "Ah!s".

Some of us (especially Ruth) bought some of the handicrafts sold by the Carajas Indians at the booth in the Zoo.

A happy hour was ordered at the Centro Comercial near our hotel where we serenaded by a local drum and bugle corps whose talents were not yet fully developed.

Dinner back at the Maxwell as guests of the still wonderful C.V.R.D.

July 9, 1994

Great news...young John is doing well enough and will be boarding a Varig flight this morning! He'll be traveling with Rejania and the Carajas mine doctor to Brasilia for additional medical care. Clad in tennis shoes, pants and a cast covering his head and chest, John bid us farewell with these words, "Coming of age in Brazil." Our two-camera-carrying geographer from Michigan has officially been christened "jabaru." I'm not sure if he'll ever be called Gordon again.

Yes, it's time for an adventure in the jungle! Young, clean-shaven Claudio I, who works with public relations at the mine, and rough, machete and gun-carrying Claudio II led the way through the jungle area outside the fences of Jurassic Park (thanks, Emilio). Along our path, we sampled our first Brazil Nuts, which were taken from the inside of a hard, brown fruit about four inches in diameter. Claudio II had a hard time cracking the outer shell of the fruit with his machete. It's hard to believe that a macaw can easily crack it with its beak. This wild and lush jungle includes mahogany trees and the trees with yellow fruit from which chocolate is made. Nancy's comment really described it well, "I love when you see your house plants, but they're forty feet tall."

Following the trail into the jungle was interesting but feeling a little too tame. When the group wanted more, Claudio II turned right into a dense section of jungle and showed us major bushwhacking with his machete, clearing a very narrow path for us to follow. There was no need to define dense any more. Plant species flourished abundantly...however, we must have scared off all wildlife. Where were the seven hundred plus species of butterflies? I think I saw one or two. The road was a welcome site! Shannon still wonders what bit her...

While part of the group had ventured into the forest, others had been having their own adventure within Jurassic Park. Leave it to Curt and Emilio to cross paths with the local indigenous population...not in the jungle but in the city park. Curt dropped a few real after purchasing a picture and an Indian headdress. Sadly enough, the Indians didn't know about the new currency (real) and thought Curt was trying to rip them off.

We bid farewell to Jurassic Park and left the confines of the perimeter fences. Varig Airlines would be taking us to Belem for our first glimpse of the Amazon River. Several of the dance students from the school joined us for the ride to the airport...giving several of our group members the chance to learn a little samba.

Our forty-five minute flight to Belem gave us just enough time for another Varig meal! Belem houses two million people and is about 120 kilometer from the Atlantic Ocean and 160 kilometers from the Equator. It's hot, humid, and rainy every day. It's summer here even though it's winter in Brazil...I still can't figure that one out.

Streets were deserted...no nuclear fallout...just the latest soccer game (Brazil vs. Holland). A local pub down the street from our hotel provided us with the chance to observe the Brazilian fans...and the 3-2 victory...fireworks, honking horns...Brazil! Brazil! Brazil! Of course, you don't want to forget Aaron sharing his bear with a machine-gun clad guard down the street. We left with our yellow and green finger gloves and a R$74 bill...new math doesn't quite compute that when you are paying R$1 for a beer...a compromise of R$36 was accepted...welcome to Belem.

The city's buildings looked old from all the mildew and moisture. The European influence on architecture was apparent...reminding me of New Orleans. It was hard to find a building that didn't have any graffiti on it; sidewalks were in need of repair. Dinner at La em Casa (Marco Antonio's recommendation) was great...the feeling of an outdoor cafe...but being sheltered from the rain. Terry and Zeze allowed us to sample their duck. Our quiet and enjoyable evening should have been a forewarning of the next day's encounters...the quiet before the storm...[Linda Reeves]

July 12, 1994

I greeted the day by doubly treating myself: a new blade for my razor and a clean pair of underwear. Around 8:00 we marched over to the docks of the downtown area of Manaus and found the maritime vessel, the Vasco Vasques, that would be enabling our river cruise (excursoes fluviais). On getting aboard, many of our crew were delighted to discover the rig's price for caipirinhas was $1.00.

By 9:25 we had made our way down or up the river. The voice of the tour guide--alternatingly in Portuguese and English--pelted our ears from the boat's speakers. When he was not informing us about landmarks on the shore, our guide (adorned with sweatshirt, jacket, and captain's cap) played Brazilian music that set a surreal mood on board. Besides our group, there was another group of about twenty Germans. One bespectacled, bearded gentleman in that group was reading Gravity's Rainbow.

What was so amazing about this Amazon River was the sheer volume of water. Where we were at one point, the river was about three miles wide. (At some points, it's seven miles wide.) Our tour guide explained to us how the confluence of the river brings together the "light" water of the Rio Solimoes with the "dark" water of the Rio Negro. We saw this confluence, and adding spice to the experience were some sporting dolphins. We turned around and went up a channel which became a lake.

A boat goes upstream every day to provide the people with anything they want. As a word of wisdom, Shirley shared this about the Amazon: "Don't squat in the river." Also, she noted how "the Amazon river is turbid because the velocity of the water's movement is great enough to keep the silt in suspension." She also added, "I'm shivering. The last time I was in Manaus it was 110 degrees, just about the same time of year." Gordon reported that the caipirinhas served on deck were strong but smooth.

On this boating outing we also saw some very large iguana. They were one-third of the way up a tree. Marcos, our aggressive tour guide, unfortunately asked on of the young Indian assistants to climb the tree to agitate the iguana. As a result, we saw three of them dive off the tree for the water. The assistant, climbing the tree barefoot, cut his foot in the process.

The drivers of the boats did well navigating the junkets through an Amazon tropical jungle which at points closed in on us to nearly impassable proportions. Of the birds, most notable, said Nancy, were the fork-tailed fly-catcher, a baby big white owl, and a poignant pose of a vulture and a hawk juxtaposed on branches a few feet apart.

When we hit the more open areas of the Amazon tributaries, our attention was captured by a pink dolphin. It appeared to us many times, but I don't think any of us managed to catch it on film. Earlier Ruth had pointed out how she had seen a pink river dolphin, one of the three kinds of dolphins found in the Amazon. She is in possession of an article on river dolphins if anyone wants to read it.

Back at the floating motel (flotel), Ruth attempted to get a card game--Oh Heck!--going. It's an incredibly sophisticated game. It became apparent once again the degree to which Ruth enjoys giving directions to this game. Ruth, Aaron, Linda, Howard, and Curt played. Howard won. A little later Dr. Ling Ching Chow suddenly ejaculated that she found the boat outing, "Refreshing, very refreshing." During this relaxing time, Susan asked me if I had gotten "the parrot that whistled" into the journal entry. The parrot goes "Whaaaaat, whaaaaat." I said, "No." But now I have.

After supper we went out in the deep darkness of the night to shine alligators. If one shines a flashlight along the shore, the gator's eyes shine like two glowing embers: actually they are reflecting the light (as one gets reflections from human eyes in using a flash without the "red-eye" feature--so Gordon informed us). Each boat spotted a gator, caught it, and generally abused it before returning it to its natural habitat.

The folks in the other boat experienced an interesting happening. A small fish was anxious to get in on the Fulbright action and therefore jumped into the boat, hitting Ruth in the back and Linda on the foot. The twosome blamed Emilio for this occurrence; he rightfully pled innocent. Not until we saw a jumping fish the next day did our doubting duo absolve Emilio of any involvement in the incident.

The highlight of this particular boat outing for me was when we simply sat and listened to the jungle. Enveloped by sounds, the

(there was no p. 13)

teeming life--in all its dynamic diversity, lying behind the tranquil setting--could be felt.

After arriving back at our flotel, many of the group wanted to go out again, which they did. On that jaunt, Howard was able to get some sleep, reported Susan. A few of us stayed back at the flotel. Emilio, Gordon, and I, rather hard-up for entertainment, watched a dog defecate on the deck right in front of our table. Shortly thereafter another dog came and peed on the defecated substance. It was really exciting.

After the other group returned from their boating adventure, we had some time to sit down and reflect on our "Amazon experience." We discussed the deficiencies of our experience in the Brazilian jungle. Everyone agreed that they were disappointed: the expectation was terra firme, the tropical rain forest with the high canopy. We concluded that right there where we were in space--a few miles out of Manuas--and right there where we were in time--at the time of year when the river was so high--it was simply not possible for us to have the type of experience we hoped for. Some thought that to have gone up the river a ways, instead of spending time at the flotel, would have made for a richer experience. Everybody agreed that it would have been good to have had a naturalist along and to have taken a trip that was different from the regular tourist gig.

One luxury liner for sleeping was the Acura. The other sleeping boat was the Aturia. The night for me on the Acura was anything but a cure for my tiredness. After lying down on the bed, I quickly experienced claustrophobia. Incredibly fleet of mind, I finally figured out that possibly this experience was related to the fact that our cubicles were 2 feet by 3 feet by 4 feet. I decided to go out and sit on the chairs on the deck. But soon the fumes from the diesel engine got to me. I moved to the lounge area in the back of the boat, lying on the cushions. That was most comfortable; but the diesel fumes were seeping into that area and soon they became intolerable. So I went over to the table area on the float. The mixture of fish cuisine and engine fumes manifested itself in the form of painful gas which could receive relief only through the means of belching. Thus, my belching was quite rigorous. It seems that some of the belches were loud enough to make the dogs bark. Therefore, to silence that dogs I finally had to leave that area of the flotel, which I held off doing because the breeze was coming across the river and providing some much-appreciated fumeless air which was gradually breathing life back into me as I deeply inhaled it. But out of fear of being on the receiving end of one of those blow-gun darts because of having instigated the dogs' barking, I finally made my way back to our cozy cubby. By this time, roommate John had turned off the air conditioner that had been blasting its cold air over his body situated one-and-a-half inches from it. Actually, I spent very little time in my mini king-size bed anyway. Most of the night was spent instead on the king's throne, where I was sweating like a horse. So little sleep I had during that restless night out on the Amazon back in July of '94. But then, I should feel fortunate. We might have paid $395 to "stay over" in the Amazon; fortunately, we kicked out only $112 for this experience of a lifetime. For me, it ended up being just that, but not quite as I had expected. Terry had warned us, remember, that night in Brasilia at Marco Antonio's when we signed up for this sensational spectacle in the swamp.

Curt Thompson

Overnight in the "Jungle Manaus"
July 13, 1994

Early morning twilight found us emerging from our respective cabins aboard the ACARA' and ATURIA, lungs filled with diesel fumes from the noisy nocturnal generator. Just before 6 a.m. parrots flew overhead with their raucous wake-up call. During the night, our group had rearranged living quarters to flee to cooler, less noisy--and sweeter scented--decks. A cool breeze was blowing toward the rising sun, the generators pounded, and locals paddled by in their dugout canoes. Waves lapped at the floating grass islands where last night we had searched for alligators.

Children and cats played on the floating docks before breakfast. Lungching Chiao, our visitor from the Center for International Education in Washington, D.C., showed pen and paper to one of the little girls who lived on the floating docks. Lungching encouraged her to write the alphabet, which she did, slowly forming the letter A through K and the numerals, 1 through 8.

Commenting on the diesel fumes and previous night's noise, Emilio said to no one in particular, "It was the best of times, it was the worst of times." Rachel related that "Susan says I look crisp and fresh this morning because I found water in the toilet and washed my face in it." (Out of the fourteen seminar participants, two slept well--one was constipated, some were nursing hangovers, and others suffered sleep deprivation). Comments were that the local rubber economy was depressed until we tourists arrived!

We finally seated ourselves before our breakfast of orange juice, lunch meat, cheese, toasted dinner rolls, sweet rice (?) pancakes, fried eggs, coffee, hot milk, fried bananas, and assorted local fruit. Emilio commented that the "local latex was used for our pancakes" and placed "latex-covered" bananas on his pancakes. Susan said "Leave it!" Brian called the pancakes "grits 'n glue". After our meal, Brian stretched out supine on a picnic table near the boat docks, attached his neck-traction device ("cerebral jock-strap"), and Aaron pulled on the blue cords attached to it applying traction to Brian's neck. Brian said to Aaron, "When you're done, I'll be 6 foot 8!"

During our morning ride in a runabout along and across the flooding rivers, we viewed swirling eddies; partially-flooded buildings; and schools and churches with only steps leading to the buildings above the floodwaters. We saw a hospital boat (with tourists), many tropical birds, the "Flamingo Club" and "3 Maria" which appeared to be the local pubs, a small boat loaded with cargo, and cattle in the water feeding on drifting vegetation. Women were doing laundry in the river, perched on steps to houses, as dogs lay sleeping on the porches. Many inundated homes had washing hanging out to dry (if possible in such a humid locale), an occasional rooster on the roof, and nearby trees devoid of leaves but decorated by Mother Nature with red pods and white flowers. Other trees showed red leaves alone or among green ones. In places, cows were packed into corrals on small islands or floating rafts as the rising floodwaters covered their pasturelands. On one boat, Brian was dangling his feet in the water as we plied the turbid waters along submerged channelways. Nancy laughed: "Wait 'till he pulls his legs up without feet!" referring to the piranha that inhabit these waters.

As we motored along, birds were singing songs in the trees. Howard asked, "Hear that call there? They're saying 'now we've got 'em where we want 'em!'" As we waited in our boat, Brian's boat broke through the tall grasses and trees. We propelled our way through narrow trails within, and surrounded by, rainforest. Vines were hanging everywhere almost to the water's surface. Some vines were laced about the tree trunks, resembling shoelaces. With the suspended sediment trapped by the effective filtering action of the vegetation, the water changed to an almost-clear appearance and felt somewhat cooler under the shading canopy. In the shadows grew ferns, palms, and huge trees, and an occasional splash of color--purple, white, red. Our group compared this outing to a Disneyland ride as we sat, awe-struck by the primeval beauty.

After several hours, we began wondering where the lily pads were that we had set out to see. The light rain intensified and the boats returned to the restaurant/dock area. We then proceeded back behind the floating building to the lilies, Victoria amazonica, with their pads 4 ft across and a few white blossoms. A chorus of motor-driven cameras whirred as we approached this small area.

We returned to the docks in a light rain to find tables set for lunch, the water turned on to the berths, and the smelly generator throbbing aft. Small children were running about, and Brian and Rachel paddled their dugouts into the waiting jungle.

After a prolonged lunch of fish, fruit, and leftovers the group boarded the VASCO VELAQUES for the return voyage to Manaus. We departed as a group of tourist arrived on a two-decker blue boat.

The sky was dark and rain was threatening. We slowly pulled away from our brief stay in the 'jungle' with mixed emotions. A few of us took photos of the flooded Amazonian drainage while others remained below to update their journals or to catch-up on their reading. Rain began to fall and the blue tarps that had been rolled up along the open windows of the boat were unfurled, cutting off the view. The rain splashed ever more intensely on the River's surface and eventually formed patterns of rainwater slicks across the flowing alkaline waters of the Rio Negro.

We donned raingear for the walk to Hotel Amazonas as the boat's pilot tried, with forward and reverse maneuvers, to slide us alongside several other parallel-parked boats. After a quarter-hour of boat-parking, we said our goodbyes to the crew and Marco, and hurried in a light rain through the crowd that was returning to their boats with the day's purchases.

We met Terry in the Hotel lobby and were briefed on today's and tomorrow's schedules. Our evening was optional: some opted to view the soccer game (Brasil=1, Sweden=0) at a huge stadium; some, at local TV's; and others opted to study and ready themselves for the next day's trip. [S. Valencia]

July 14, 1994

It is assumed that all have slept well, considering the lack thereof on the previous overnight when engine fumes and tight quarters seriously impaired our efforts to catch the Z's. I myself am this morning suffering semi-serious stomach cramps after a slight fever last night; I venture to guess my immunity system was taxed and compromised during that Amazon stay.

A 12:30 check-out provides a free morning and everyone wanders through the streets seeking film, mementoes or medicinal relief. I walk through the streets, purchase my ASA 400 films (Hell, no one in Brasil seems to stock the 200's that they advertise in their windows!). Returning to the hotel, I meet David at the pharmacy as he is stocking up on the medicine he became intimate with on the Amazon. (He became victim #3 or #4 when his system shut down and he stayed on the boat while the rest of us went in search of water lilies or alligators to taunt.)

Paying the hotel bill proved a monumental chore. Whereas Curt and John are able to take care of it quite quickly, I encounter problems as I am paying in both Brasilian and American currency. One of the problems, yet again, is that change is a scarce commodity, and I must wait for the clerk to somehow acquire it.

INCIDENTAL NOTES ON THAT MORNING:

-After my acidic breakfast, I join Shirley in a walk to the fish market wherein I learn to sidestep banana boats for fear of the banana spider whose bite is instantaneously fatal. We spy all manner of fish save the 'big ones' she seeks, and we return after an hour with a couple of trident fish hooks and various incidentals. The blouse she took along for bartering remains with her and she leaves it as a tip atop her bed for the chambermaid.

-Brian had a scheduled meeting at the University this morning, but returns unrequited. Seems he was "stood up!" Seems they knew he was comin' and his reputation preceded him.

At 12:30 we depart Manaus, and connect to Salvador at Brasilia airport wherein we leave Lingching Chiao, and Marco Antonio meets us with stipends of $464.50 Reals apiece. Terry informs us that

this is to be our next to last stipend before our five-day epilogue in Rio. (At Volto Redondo we are to learn differently.)

A long bus ride to the Salvador Tropical De Bahia reveals a well-lit metropolis, but not much else.

At the hotel, we are pleased to note its five-star status, a far cry from both the Amazonas and the blasted barge on the Amazon. Premiero John buys his wife a necklace at the Hotel's Stern shop.

Susan dives immediately into the pool, while Milo, Ruth, Howard, Shannon and I rack 'em up at the pool table that is as straight as Lungching's logic.

The night ends with caipirinhas and beer pool side. Nancy relates her travails in Nicaragua wherein she witnessed the Contras' murder of four innocent civilians, and her stunned audience sits reflectively. The silence is broken only by Gordon's curious query, "Do you have nightmares, Nancy?" Nancy offers on reply.

Aaron Braun

Journal entry for July 15, 1994, Salvadore, Brasil, population 3 million; destiny, to sing and dance.

Culture and cultural imperatives pervaded our activities in Salvador. Salvador and Bahia were special, not menacing like Belem. The region's economic difficulties are severe with the vast majority black and poor. But the atmosphere and psychology contrasted dramatically with the heavy, foreboding, and violent ambiance of Belem. In Salvador, the heights, the ridges and plateaus, house the wealthy while the valleys and lowlands are filled with lower income people and favela dwellers. Rio is just the opposite. There the wealthy seized the low and beach front areas, relegating the poor to the steep slopes and back of city areas around the commercial port and low-lying industrial complexes to the north.

In Salvador, music, dance, African-based popular religion (cults?), and other African influences dominate. Bahia may produce 80% of Brasil's creative folk, according to one Bahiaphile, a transplanted American. He claimed that in Bahia the joy of life is manifest. With at least 40% of the population in the informal economy, earning less that $65 monthly, this judgement was hard to accept. But there is something to it, an intangible embracing of the light fantastic. Who knows what lurks in the hearts of people?

Our morning was spent at ACBEU, an organization dedicated to the spread and appreciation of American and Brasilian culture. There we were introduced to Bahia culture with particular attention to an historic music form. Rhythms and instruments evolving from slave culture were demonstrated by a *capoeira* master and his two students. Many of the dances conveyed warnings of danger: that the white masters were coming, that some undefined danger threatened, that knives were being employed. The athleticism of the dancers astounded an enraptured audience of eager Fulbrighters.

Commingled with the warning function of the dances were defensive and offensive purposes. Certain movements, combinations of foot, knee, palm, and finger strokes obstructed assault and launched a lightning-like attack. The ritual, the *capoeira*, reflected a story-telling tradition that utilized dance, song, and pantomime. It owes much to a slave culture dominated by Uruba-speaking peoples from contemporary Nigeria who learned a Portuguese patois.

Following this delightful and educational experience, we crowded into cabs that sped us to a restaurant by the sea. There we swilled seafood and drink for two hours plus. Having stuffed our guts what could be more enticing than a journey to the Federal University of Salvador for an afternoon of lectures. The first speaker described the environmental regulations of Bahia. He was followed by a biologist engaged in an effort to protect from hotel and resort development a vast stretch of seashore and Atlantic rain forest to the north of Salvador. The final speaker represented CENTREL, a private organization mandated to protect the environment from dangerous liquid wastes. These were dedicated individuals, confronting the great conundrum of Brasil: how can ecologies be sustained without dampening the creation of jobs and new wealth?

The day had just begun. Many of us rode off that night to a giant block party in the *Largo do Pelourinho* where we drank and listened to wonderful music *ao centro Fundaco Casa de Jorge Amado*. Oh what a night! Steel bands and Jamaicans, samba galore, street vendors and street kids, Salvadoran good luck ribbons aimed at a Brasilian victory in the up-coming final World Cup match against Italy. All capped off by splendid late night repast in the courtyard filled with restaurants, music, and dancers. Ahhh, what a morning!

Journal July 16th

Meeting time at 10:00 o'clock after a well stocked breakfast of sweet rolls, filled rolls, breads, 6 fruit juices, cut up fresh fruit, hot chocolate and Brazilian coffee at our five star hotel. The waitress is in full Bahian costume.

Off to take our first public bus (without Terry) to Pelourinho, the beautiful old upper level quarter of Salvador. First we walk this way and then that way. Finally we decide on a route. A mother, a ragged son, and a dog board the back door in front of us where a collector takes 20 centavos from each of us.

Pelourinho is beautiful, the loveliest of old colonial architecture. The views up and down the streets are spectacular. Buildings of pastel colors from peach to flamingo pink to azul, cobbled streets running up and down, old church steeples silhouetted against the sky. There is a church for everyday of the week in Salvador.

Linda spots a purple skirt and shell top in one of the small shops. The shopkeeper alters it for her while she waits. Curt asks our opinion of an outfit for his wife which takes two more trips before he decides to buy it. After much wheeling and dealing Curt arranges for us to attend a Candomble service this evening. We are very grateful.

We wander up and down streets, in and out of small shops hardly wide enough to stand in. Lovely art work everywhere. Lots of folk art and churches to visit. Women dressed in white Bahian costumes wander around beckoning us. I first thought they wanted us to visit the churches, but found out they wanted money to pose for pictures.

The Church of Sao Francisco closes for lunch so we head down toward the Mercado via the lacerda. The rain comes in torrents and we rush for cover under the roof of the bus stop. All sorts of rain gear is pulled out of our backpacks. Brian thinks Big John looks like the Virgin in his long blue poncho. The local men are heavy into a domino game under a nearby roof. Brian joins them and chats away in Spanish which they understand.

Outside the old quarter, the buildings are not rehabilitated; they are gray with mildew and the black and white tiled sidewalks are crumbling. Crossing the street is quite a challenge for a group of our size, but someone is always in need of another roll of film. The view from the elevator is beautiful with the sun bouncing off the harbor water below; sailboats and freighters in the distance with the fort guarding the entrance.

We crowd together clutching our sacks afraid of the much publicized elevator thieves. The only thing we lose is the price of a trip - 5 centavos. As we step off the elevator approaching the Mercado, we are set upon by groups of

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pedlars "Good deal on necklaces...Buy my ribbons...

Upstairs at the Mercado are two restaurants overlooking the harbor where we plan to meet Terry, Zeze, and Shannon.

Lunch is a two hour happening with Rejania ordering the fish specialties of the house. Aaron periodically appears with items from the market for us to preview. First a leather bad, then a series of leather vests.

The market is overwhelming, stall after stall of lace, clothes, kongas, sex gods, T-shirts, sandals, bags, minerals. Children are everywhere selling good luck ribbons. Gordon buys a blow gun for 7 dollars. How will he carry it for the remainder of the trip?

Shirley, Gordon, and I return to the Church of Sao Francisco. The afternoon light in the square is glorious, perfect for photographs. The courtyard within the church is decorated in beautiful old blue Portuguese tiles depicting bible scenes, even a four-breasted woman.

Inside the dark church is a mass of gilt and cherubs, all rather unhappy appearing. The masons who were forced to work sculpted their revenge. Gordon, our master photographer, works out a way to photograph this dark church.

A late afternoon swim in the dark. Darkness is 5:45 here.

A fast bite by the pool before our Candomble service. Curt and John anticipate a large chef salad, but hard boiled eggs and canned peas materialize.

We dress respectfully, ladies' legs covered and Brian's shoulders. Anticipation and ambiguity are high. Jorge arrives with two vans; we pay our $15 and are off to the favela. We wait outside on a 10x10 dirt terrace because we are too early. Jorge and Howard, our master translator, keep us entertained with a history of the Candomble religion. On our way up the stairs we have passed a small shrine to the African deity Orixas with offerings of food and champagne.

After more than an hour, we file in mulhers on one side and the homens on the other. The women were 'cheek to cheek.'

For the next hour or two we wait, listening to an explanation of the religious pictures in the room, many of which are Catholic and then to a description of the area set aside for the mother spirits. This small area is bordered with a railing; inside are two different side chairs. An arch over the chairs is decorated with palm leaves; the floor is leaf-strewn with a square in the middle. Off to the side is a small room brimming with offerings: melons, cooked chickens, beer, cake, money. The women juggle for seats; one is afraid to leave their seat for fear of having to stand for the rest of the time.

We discover that Aaron has been left behind when he ran upstairs for his good luck charm.

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The wait is very long and the cement bench very uncomfortable. People keep coming and going. We are unsure of what is happening.

About 10:30 the chanting and dancing begin with several of the old and young women in hooped dresses and turbans. The three drummers beat out the rhythm continuing without stopping until the break at 11:45. Curt sitting next to the music claims his liver vibrates. A chanter leads the group as they sway around the center floor sometimes falling flat onto the floor to touch their heads. As members go into trances, others put a towel over their heads and touch them until they are back in control.

People of all ages keep arriving, some just watching and others invited to join the never ending circle dance. Some of us are caught nodding off or perhaps entering a trance-like state!

A cup is brought out and placed in the center into which dancers dip their hands. The spirit mother sits mostly alone in the cordoned area and towards the last hour, joins the group. Drummers and chanters are replaced without the music and dance stopping. The dancers of all ages are clothed from costumes to street clothes. Some are barefoot and some in the ubiquitous flip-flops. Many boys and men are dressed in white and seem to never tire as does the old woman with the ageless face. The women and men greet each other by touching several times. There is a harmony of feeling, a brotherhood.

Our group's decorum is impeccable. Our faces admit no expression. We communicate only with our eyes.

When the break comes, we flee outside; many wishing to head back to the hotel we left four hours earlier after a full day's sightseeing. Howard (called sometimes Gordon) converses with the original chanter who wishes us to remain for the second half to see more dancing and to eat the food. Our exhaustion won out. The couple from Palo Alto and Stanford University left too.

At the hotel a group sets off in search of dinner having eaten lunch at 1:30. The only place open is Bernards, a French restaurant overlooking the bay. We are charged a cover fee because the violinist and keyboard musician are still playing. About 1:30 the main courses come except Linda and Emilio's which has to be then cooked. Their shrimp cake arrives at 1:50. Terry claims we are killing him with our lifestyle. Shannon insists she is unable to walk back to our hotel.

Bed, glorious bed. Out goes the Do Not Disturb plaque hoping Ruth will not wake us too early.

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Sunday, July 17, 1994

The visual impact of the Pelourinho is so striking that one visit cannot suffice. And I have not yet completed my mission to photograph the Church of Saint Barbara which is the setting of O Pagador de Promessas [Eng. tr. Payment as Pledged], a classic drama of the Brazilian stage, also a prize-winning movie, and even a recent TV novela [Eng. "soap opera"]. To go downtown, the first cab we consider quotes a fee of R$ 15 to take us to the Praca da Se, just a few blocks from the old area--and with that fat price tag as a deterrent, we set out to take the bus. For only $.25 you can ride the bus a considerable distance, and since we are only minutes away from the Pelourinho, we stroll to the bus stop. Unfortunately for Emilio, this trip includes having his watch stolen. It wouldn't have been so bad but the thief was a young boy who snapped the band and yanked the watch from Emilio's wrist as he was approaching the bus. So the bus trip isn't so cheap after all.

We are all attempting to complete a personal mission: to enter the Church of Sao Francisco to see the ornate gold work said to have been installed in the church in order to prevent the Portuguese from extracting it from Brazil. Unfortunately, the Museum of Afro-Brazilian Culture is closed today, which prompts us to pledge to return to Bahia to visit again. We meet Terry and Zeze at a seamstress's shop which sells hand-tailored dresses, and we all make the rounds of art galleries while moving toward the Praca. We enter the Hotel do Pelourinho which hosts some interesting and expensive galleries and shops. Terry and Zeze are returning to this place for several reasons--mainly to find a painting they saw yesterday which they would like to buy. The canvas shows a grand panorama of Salvador including the Praca de Igreja do Senhor Bomfim, the Sao Francisco Church, the elevator which connects the upper and lower cities, and other principal scenes. Colorful and extremely well executed, the painting also features several Bahians carry blank placards upon which the artist agrees to inscribe the names of Terry's family. And so "Terry,""Zeze,""Shannon," and "Tiffany" now appear on the painting as touchstones of our experience in Salvador.

Still set on finding St. Barbara's Church, we pass through the Praca and begin climbing the steep street which leads to the Igreja do Paco, the church actually used in the film and video versions of the drama. Rain forces us to take refuge in a souvenir shop facing the church where we stand and watch the water cascade down the many-tiered stairway in imitation of the Foz do Iguacu.

Great shots await us after the rain stops but not before we have one of those experiences dealing with souvenir vendors. The shop where we had found refuge had in addition to the de rigueur Pelourinho art work wooden sculptures of orixas such as Odum, Axe, etc., which were quoted at R$ 7 apiece. But as the vendor begins to wrap them the owner overhears our conversation and discovers that the going price is too low and demands R$ 20 instead. Disappointed, we have to leave the statuettes and ascend the stairway to the church empty handed. We photograph wonderful views of the stairway and after we return to the shop en route to the Praca, the vendor motions to us that the price is now R$ 15 to which we counter an offer of R$ 10. SOLD!

The World's Cup in Brazil is like a combination of New Year's Eve, Super Bowl, World Series and assorted other momentous occasions in sport. The Hotel da Bahia has arranged to show the game on a giant screen, and the Fulbright team wears our "team shirts," i.e., the green, yellow, and white bargello prints we bought in Manaus for R$

2 each. During the championship game, Brazil dominates throughout the standard 2 periods, and because there the game has ended in a tie score, [0 to 0], Brazil, Italy, and their fans must also endure 2 overtime periods which also go scoreless. Then comes the shoot-out. Brazil leads 3 - 2 and is declared the world champion when Italy misses its last goal kick. Some of us are so surprised that we don't realize that the game is over until the crowd launches a deafening roar.

As though this were not enough excitement, Brazilians from all around the country appear on the giant video screen for the beginning of a night of revelry. Here in Bahia, celebrants gather at the Farol, the lighthouse which has instantly been converted into an ad-hoc sambodromo. We hear that the crowd can get rough, but the Intrepid Linda and I set out to see for ourselves.

I usually shy away from crowds, and so plunging into this mob goes against the grain for me. But we find ourselves surrounded by young people who are drinking, dancing, talking and having fun being together to celebrate a hard-won victory and long night's drinking into day. Inching through the current of joyous humanity, we navigate amidst the seemingly solid mass of folks and try to find a path from the Lighthouse back toward the hotel, but surrounding us stand different groups of young people determined to continue celebrating come what may. [Howard Frazier]

Iguacau Falls
July 20, 1994

An early start this morning from the hotel in Curitiba--7:30. We sat on the bus for a while, watching everyone struggle with their swelling heaps of baggage--the Jabaru with his Amazon loaded baggage carrier, Linda bouncing her big suitcase down the stairs--watching to see if its contents were going to explode and annhilate the bus.

It was a very clear day and the plane seemed to follow the Iguacu River all the way from Curitiba. We passed over a large dam and then, as the plane descended--there it was--our first glimpse of the Falls, the majestic pink and white of the Hotel das Cataratas--all surrounded by dense forest. The plane banked over the Falls and the view was spectacular. White water gushing over the cliffs in a large horseshoe shape, the spray rising from the rocks below and rainbows forming in the mist.

After the usual "getting organized" and negotiating our way through the labyrinthian corridors of the hotel, we walked the trail along the Brazilian side of the falls. (If you think I can describe what we saw there, you are nuts! Each of you will have to recall that for yourself. All I can do is jog your memory a bit so that your own recollections of this incredible day come back to you!)

At the start of the trail, may coatimundis were crowded around all the tourists begging for handouts and nosing through the trash. The starting point of the trail offers a panoramic view of the falls. You think you've seen it all from there--but as the trail descends, every few feet brings another spectacular view--and, of course, another photo opportunity. (Collectively we must have many hundreds of pictures of the Falls.) The trail descends until you are finally standing on a platform in the middle of the river, with water crashing down from above and rushing under the bridge platform to flood over another drop right in front of you. The volume of water, the sound and the thick, blowing mist are incredible.

We had to hurry back to be ready for a trip to the Argentine side of the Falls--which wasn't easy, given the number of people on the trail. The bus ride to Argentina took about an hour. We stopped briefly at the border to have our passports stamped. There was a vast line of trucks coming into Brazil loaded with onions, potatoes and other things. Just before the border, there was an encampment of gypsies. After a short time, we turned onto a dirt road. The walkway out to the Falls was partially destroyed by high water in 1992, so we took a boat to the part which is still intact, walked, then another boat and then a short walk to look over the main part of the Falls. The volume of water--the sheer power of it--and the crashing spray that hits the bottom and flies up again to the top is overwhelming.

We also went where, in a short walk, we could see many of the smaller falls close up and also some great panoramic views of the big falls.

Again, we hurried to make time for a short trip to Paraguay--but as we approached the border, there were so many trucks waiting in line to cross that it was clear it would be a least a two hour wait--so we headed back to the hotel, stopping for free chocolate drinks, chocolate samples, and an over-stuffed, over-priced souvenir shop.

In the evening, after a few drinks and a great buffet dinner at the hotel, some of us walked the falls trail again by moonlight--which was one of the most amazing experiences of the trip. The roaring water was almost florescent white in the darkness. There was no one on the trail--only mist, moonlight, the blackness of the forest and the white of the water.

Nancy

JOURNAL

JULY 22
SÃO PAULO, SÃO PAULO

Breakfast at the Hotel Saint German was followed by travel in our large, comfortable, cold, and chemical-smelling bus to the offices of the Secretariat of Environmental affairs for the State of São Paulo. There Dr. Edis Milare provided us with a history of the development and scope of São Paulo's environmental program. We then travelled to the Companhia de Technologia e Saneamento Ambiental (CETESB) where we were met by Celia Castello and other members of the CETESB staff. We were shown through a museum and their monitoring center. We also saw a video--big suprise!-- on the work of the agency. Particularly on the cleaning up of the city of Cubatão. We were also treated to a slide lecture by a CETESB functionary with an unusual, but interesting balding pattern. CETESB hosted lunch where some of us got the opportunity to talk with Alfred Szwarc, who oversees CETESB's vehicle-caused air pollution clean up efforts...very interesting. We visited Szwarc's auto emission testing laboratory before we left for the Instituto Florestal.

It was at that point that an increasingly ill, Ruth was returned to the Saint Germain and Aaron and Nancy abandoned the main group to check into a cinema. Here is what they missed:

1. A failed experiment in plane geometry when our driver scraped up the bus in an attempt to turn a corner that could accommodate a thirty foot vehicle. His only problem was the fifty foot plus length of our bus. We became the principal entertainment for the neighborhood on a Friday afternoon that might otherwise have been pretty dull.

2. One of the more thought provoking events of our tour occurred when the exceptionally charming Fulbright hopeful Ligia Moreira da Rocha escorted us through the tropical rain forest of one of São Paulo's huge urban parks, the Parque Estadual da Cantareira, to a gigantic monlith that overlooks a large chunk of the city of São Paulo. Ligia had us sit quitely for a few minutes to think about the panorama spread before us. We saw the unstoppable city (growth rate: 500,000 per year) pushing against a rapidly diminishing natural environment.

3. A visit to a museum operated by the Instituto that contained some of the finest woodwork many of us had ever seen.

At night we scattered through the area adjacent to the hotel.

July 23, 1994

A heavy rain and dark skies set the tone for our free day in Sao Paulo. Not letting weather stop us. . .Rejania, Gazriella, Howard, Emilio, and I set off on our adventure. . .visiting the local mall with its numerous bookstores, riding the subway, and stopping at Praca da Se. As we walked around the historic square, we had the feeling that nice folks had stayed home because of the rain and the shadier folks were the only ones out. . .waiting for unsuspecting folks like ourselves. Fortunately, our visit was a fast one and completed without an incident.

This was definitely a day of the churches. . .each was unique and magnificent in its own way. . . endless ceilings, domed paintings, life-like statues, and solitary worshippers. We spent a few minutes reflecting. . .as the rain fell outside. As we continued walking, we decided to take a break from the rain and stop in a bakery that provided us of us with some tasty morsels. Brief moments like this will always be remembered. . .time with Rejania and Gazriella. . .the bakery workers. . .and fellow participants.

Yes, it was still raining in the evening. Folks decided to experience their first movie in Brazil. "House of Spirits" was a powerful American movie exploring female relationships as well as spiritualism. Portuguese subtitles. . .what a great way to learn reinforce Portuguese vocabulary. Our R$4 ticket was well worth the experience.

Dinner followed at the Alameda Grill. . .a return trip for several of us. We had discovered it accidentally last night. . . a delightful salad and vegetable bar, good food that was reasonably priced, and a very pleasant atmosphere. How does a place like this survive when there are only a few customers each night? How late do the Brasilians eat? Another interesting day in Brazil. . .

Linda Reeves

July 25, 1994

The day began in Santos, where the night before ended. We started the day off with an especially delicious breakfast on the sixth floor of the three star Mendes Panorma Hotel. Our scheduled bus departure of 9:00 a.m. was postponed to 11:00 so that the members of the Fulbright Seminar Abroad group might have a few more precious minutes to explore the wonders of Latin America's largest port. John, Gordon, David, and Curt, for instance, spent time walking up and down the beach, thinking that they noticed some irregularities in a few of the condominiums along the shore. While they were debating the interpretation of their perceptions, a curvaceous woman marched up to them and confirmed that, yes, many of the buildings are leaning because they were constructed on sand. This likely was one of the reasons they named the city Sand-toes (the toes or feet of the buildings were dug into the sand; then over time the "d" and "e" were dropped). I apologize. Shirley, Ruth, Shannon, Howard, and Emilio were seen walking on the shore. After the beach, Dave and Curt made their way to a cd shop where they each picked up Copa 94. Curt also purchased the new Olodum cd and one by Negra.

Soon we were loaded onto the bus. Because of the slowness of taking the route along the coast, it was decided to go back to Sao Paulo to catch the freeway. In meandering slowly once again through this gigantic urban area, we noted two establishments: the Madonna, where men can "relax" in receiving a massage, and the Delirium Motel, where we thought a number of our bunch could appropriately spend some time. Most people fell asleep. We had our comfortable bus back again. Brian was reading Paul Krugman's The Age of Diminished Expectations; he is convinced that economics is what makes the world go around. Shannon, inspired by the Santos beach, wrote three poems; she also took a bunch of pictures out of the bus window which, she said, will come out as big blurs. (The one drawback for me with this bus was the smell. It might have been the odor of a cleansing agent [lemon Pledge or something], or it might have been the odor of diesel fumes, or a combination. It struck me to be just like the odor that permeated the sleeping quarters on the Amazon, so I think it was the diesel [see the journal entry for July 12, supra pp. , for further comments on this most insidious and dreadful or odors].)

About 12:45, after traveling quite a ways on the highway heading to Volta Redonda, the bus pulled into Tamborinedeguy for lunch. Many found the Misto Quenche hot sandwiches to be quite tasty. And the price was right. Shortly after we left the Tamborinedeguy truck stop, we passed the shrine to the patron saint of Brazil. In passing out of the state of Sao Paulo and into the state of Rio de Janeiro, we observed that many cars were being stopped to see if they were transporting construction materials and or clothing which can be purchased for substantially less in Sao Paulo than in Rio (presumably because of the difference in tax structure between the two states).

At 5:45 p.m. we arrived in Volta Redonda, Zeze's home town, and soon we were pulling up to the Hotel Bela Vista, which had most spacious rooms. We met at 7:00 to head to the potato house where we were treated to a fabulous feast together with music from a live band of young musicians who provided a samba beat that inspired Susan, Gordon, and others to achieve possibly their greatest rhythmic dance-floor feats of the trip.

Curt Thompson

July 26, 1994

We returned to Hotel Bela Vista from Bar do Batata in Barra Mansa, just after midnight. As we descended the steps of our luxurious bus, we had a nice--although somewhat blurry--view of flares, fumes, and steam arising from Companhia Siderurgica Nacional's steel mill. Later, dense fog greeted our trek to the breakfast room. As we gathered, one-by-one, on the patio after breakfast, the fog gradually lifted. Gordon decided that this was the time to take a group photograph. His camera was propped on a small tripod and balanced gingerly on the slats of a wooden chair's seat. The camera's self-timer was set for 9.2 seconds allowing Gordon enough time to pose the group, dash to the front of the camera and seat himself with a big smile before the shutter snapped closed. Each group-member's camera, in turn, was aimed at the group--by now with smiles firmly frozen on their faces--and clicked and whirred.

We dropped down into the town, from our perch on the hill where the Hotel was placed, into a brownish-white haze. The sun broke through as the bus halted long enough for the photo-enthusiasts to climb up a small rise, past the flamboyant (Delonix regia) and kapok trees, to capture views overlooking the steaming parts of the steel mill. As our tour of the mill had been canceled by the Companhia Siderurgica Macional as had a hosted lunch, we departed Volta Redondo several hours earlier than scheduled. A lively discussion of politics ensued at the rear of the bus: labor and teachers' unions; left, right, policies, platforms. . . .

A while later we stopped for photos at a lookout with a tall, but delapidated, tower overgrown with vegetation. The view was beautiful as we composed panoramas of the distant grass-covered slopes, reservoir, landslides of red soil, and banana plantations. Some group-members took close-ups of flowers and butterflies while other studied the bas relief on the pedestal from which the tower rose. Bouganvilleas of red and orange wrapped their vines about acacia trees. Yellow butterflies flitted across red hibiscus. A grassfire moved upslope between rows of banana palms. The sun was warm and the air was heavy with humidity remaining from the morning's fog.

We drove through the greater Rio de Janeiro area past favelas and into the port area. It was in the low 80's and humid with a fair amount of haze in the air. Terry narrated as we passed among the steep granite monoliths Corcovado (Christ the Redeemer) and Pao de Acucar (Sugarloaf), a 17th century fort, the second largest port in Brazil, and the Copacabana, Ipanema, and Leblon beach areas. Cariocas were everywhere!

Later we learned that many events had transpired during out first afternoon and evening in Ipanema: Terry's daughter, Shannon, and

friend had been surrounded by small children who "frisked" them by shoving their hands in their pockets as the girls tried to beat them off; some group members had a nice flounder dinner followed by a ride on the Hotel's elevator to view the beaches; and John, Susan, and Dave went swimming in Ipanema's cool, transparent aquamarine surf. Susan is the quintessimal sunworshipper; Dave compared the cool waters to those of the Southern California surf and allowed as how there was no comparison; and John was temporarily swept away by a rip current for added excitement. The remainder of the group went separately to dine at various restaurants and some rendezvoused later.

Shirley Valencia

Rio de Janeiro
July 27, 1994

A day packed with informative speakers (am) and an enlightening, if somewhat depressing, visit (pm) to segments of the Atlantic rain forest, now totally surrounded by Rio de Janeiro. The morning's speakers were refreshingly frank. One, Jamie Benchemol, concluded a brief historical account of Rio by characterizing the city government as thoroughly corrupt, a la America's Lincoln Steffens who entitled one c.1900 expose of urban graft, Philadelphia; Corrupt and Content. Benchemol's judgment received strong reenforcement from Bertha Becker, our second speaker, who asserted that in Brasil the privileged are the state. How like Louis XIV's famous, *"L'etat, c'est moi"*. The gist of Becker's and Benchemol's remarks clashed in substance and spirit with the cut and dried version of environmental regulation in Brasil presented by Harold Matto de Lemos, a former UNEP official and currently secretary of the federal environmental department. Matto de Lemos offered a somewhat more rosey picture than justified either by observation or written documents. He seemed to throw up a mental block against acknowledgment of rapid population growth as a severe burden in Brasil. For elites, more people keep wages down.

Our afternoon's experience in the forest preserves accentuated the Benchemol and Becker position but also offered proof of the commitment of Brasil's urban foresters to the difficult task of preservation and restoration. Tragically, foresters find themselves protecting their domain from the people. Time and again we witnessed the consequences of poaching in the forests. These poachers are no Georgia Pacific or Weyerhauser but little and poor people trying to earn a buck in one urban forest, two armed forestry employees led a gaggle of young men from a restricted area in another area, foresters are unable to replant slopes because drug lords and police cooperate to prevent it. Expanding favelas--we will visit a giant favela tomorrow--cut down whatever obstructs growth. As in Africa and Asia in Brasil population pressure forces people to pollute and destroy life-sustaining

resources. It is difficult to think of succeeding generations when undernourished. Elites offer minimal budgets to the foresters of Sao Paulo and Rio de Janeiro states. Unable to control the surrounding populations, foresters act more as police under siege than as ecologists. Foresters vs the people; victim vs victim.

In the evening, we all engaged in sociocultureal activities that are best not described.

John G. Clark

The last three days of the trip when nobody kept the official journal

July 29

I got up about 8:00, showered, and went to eat breakfast. Terry was going to Rio about 9:30, so I indicated my interest in going along. Zeze, Shannon, Terry, and I caught a cab and headed downtown. They were going to the market in the old section of the city, the market which is a number of streets, each running for close to a mile, with little shops on both sides of the narrow street. I hadn't planned on shopping, or buying anything, but I ended up buying a bag for taking "stuff" back to the States, a throw-around wrap (or table cloth), and an ecological T-Shirt. That morning Terry was talking about maids, of which there are very many in the country. I think that tradition is, in part a carryover from the slave/colonial era. Teenage girls are the usual candidates for these positions. Terry pointed out that it's getting harder to find people who will stick with the job. Girls aged 16 to 19 are typical, but often younger girls work too. Many positions are live-in. The national law is that the maids must be given time-off from Saturday noon to Monday morning.

Also, we talked to a worker in a stand-up restaurant (i.e., the customers stand up while they eat). She makes minimum wage--$65 or reals/month, from which taxes, etc. are taken out. She gets her noon meal (maybe worth about 4 $) and a half-hour to eat it. Otherwise she is working from 8:30 to 5:00. She also received transportation passes for taking the bus to work. If she lived close-in (which she doesn't) the passes would be adequate, but she passes through an extra zone and therefore has to pay extra for her travel. She has two kids and her husband also has a job. It's got to be pretty tough for them to make it.

About noon I split off from the group to make my way to the truly historical section of the city. Id didn't have tremendous success, but I managed to see quite a few of the sites. I went down to

Praca XV and found the colonial palace, which is now a cultural center with a bookstore at one end. I also got a picture of a statue of Dom Joan VI, with a homeless person sleeping at the statue's base. I saw the Gregorian Pontifical Basilica where a service was being conducted. Many of the churches I entered had masses going on.

Eventually I made my way to the Metro-subway station and paid my $.35 toll to ride the train. Once at my destination my goal was to make it to Copacabana beach from where I though I could walk back to the hotel. I found a bus marked Copacabana, paid the $.30 toll, and rode it as far as I could. After disembarking, I walked about a half-mile, hit the Copacabana beach, and walked along it the whole way, checking out various goods that were being sold. I bought a pair of trunks (for Josh, my oldest son) with a Copacabana emblem on them (5 R). At the end of the beach I made my way over to the Ipanema Beach, along with I walked back to the hotel. I arrived back at the ranch at 4:00. I didn't take the pictures I thought I would. I got a few of downtown Rio and few more of the beaches. I'm now into my last role of film (#41, and they all turned out, by the way most likely because of my peculiar way of sticking my butt out as I snapped a shot).

A while after I showered, John came back to the room with some big news. He had planned to spend most of the day on the beach, which he had done. But Susan had broken her foot. She stepped onto the bicycle path without adequately looking and a bike drove over her foot and broke it. I guess the hotel was really helpful. They got her to the hospital where x-rays were taken and a cast was put on which will have to be replaced when she gets home to Boston. Rio is the place to have a mishap. They have the best hospitals and medical facilities in all of Brazil. I guess the hotel paid for everything too. Later that evening John and I had an excellent meal at a reasonable price.

Curt Thompson

July 30, 1994

I met with Rachel during breakfast to talk about the workshop on "Economics Women, and Our Global Heritage" coming up at Thiel on August 25th. It was quite helpful.

Late in the morning five of us (John, Gordon, Dave, Nancy, and Curt) went to Petropolis, a royal setting about forty miles north of Rio. I learned a fair amount about nineteenth-century Brazilian history. Dom Pedro I (and his wife and mistress) and Dom Pedro II, who was crowned in 1841 and exiled in 1889 after the Republic was established, were the stars of Petropolis. They were the rulers during the period of the Empire. Isabel was the eldest daughter of

Dom Pedro II; she was the one who finally freed the slaves in 1888. I purchased three things at Petropolis. I bought a blue pendant and two purple earrings (totalling 4.40 R) and one Brazilwood letter opener (for 3 R).

Getting back to our hotel about 8:00, we (John, Gordon, and Curt) promptly went to our Italian restaurant for supper. Our waiter knew us (since it was our fourth time at the place) and brought me a Guarana without my ordering it.

When we got back to the hotel, we saw Susan who had lost her airline tickets. She called American, but didn't have the number of her ticket. And it was not in their computer. So she was going to have to pay $1,000 for another ticket, plus penalties, and then maybe be reimbursed $700 later. By getting the numbers of others in our group, Susan was able to figure out her number. Therefore, I expect that she will have another ticket issued with only the penalties to pay.

Curt Thompson

July 31, 1994

After breakfast we headed up to the top of the hotel to get some photographic shots of Rio. Then we went to the hippie fair about a mile down our street, Rua Prudenta de Morais. There were hundreds of booths at this fair, and prices were quite good. I bought a spoon for the kitchen (1.75 R), a coin purse (2 R), a song flute (2 R), and a wood sculpture of a male and female that I think is spiritual, sensuous, and simple. I hope my Kathy likes it.

After the Ipanema Fazir it was time to pack up. So we walked back via the beach, stopped for a stand-up sandwich, and came back to start packing. I'm now ready to go. I'm anxious to be reunited with my loved ones. Our bus leaves for the airport at 7:00 p.m. The plane doesn't leave until 10:00. From 6:00 to 7:00 we're having a little gathering for our group. We'll be giving gifts to Terry and Zeze and Rajania. They are terrific people and have provided great leadership for our trip.

Curt Thompson

CURRICULUM PROJECTS

Braun, Aaron	The Brazilian cinema: a critical appreciation of an industry in turmoil
Clark, John G.	Reflections on the relationship between Brazilian communities and the environment
Coppola, Susan B.	A program for freshmen library orientation on the country of Brazil
Fitzpatrick, Brian	Brasil
Fraser, Howard M.	The photography of workers in Brazil
Kells, Gordon F.	A photographic assessment reflecting the degradation of the Atlantic rainforest of the Serra do Mar, Cubatao, Sao Paulo, Brazil
Mandlove, Nancy	Project report
McCullough, David	One man, one city, problems and solutions: Jaime Lerner and the Curitiba program for the environment
Nugent, Rachel A.	Measuring quality of life in Brazil
Reeves, Linda	Using the fundamental themes of geography to examine Brazil
Thompson, Curtis L.	Bahian babbling about Brazil: a curriculum unit on "Brazil and biodiversity"
Tottle, Ruth E.	Think globally-act locally: environmental issues in Brazilian society
Valencia, Shirley M.	Selected sites of environmental concern in Brazil: an overview

A report was not received from Emilio A. Rodriguez. Jon Jurva and Pamela Newman were unable to complete the five-week program and therefore did not submit final reports.

THE BRAZILIAN CINEMA:

A CRITICAL APPRECIATION OF AN INDUSTRY IN TURMOIL

AARON BRAUN
BRAZILIAN FULBRIGHT SEMINAR ABROAD PROGRAM,
SUMMER, 1994
SUBMITTED NOVEMBER, 1994

She has been a renowned programmer of films at The Museum of Modern Art in New York for decades. In association with the Film Society of Lincoln Center, she has been at the forefront of discovering and promoting unknown directors with the New Directors/New Films series. She has always been very much an eminent part of the New York Film Festival. She has spearheaded many a retrospective on global film, from the prominent French and Italian to the obscure Latin American and Senegalese cinemas. In short, when Adrienne Mancia speaks about film, one would be wise to listen. And so, while xeroxing some clippings out of the Brazilian file at MOMA's Film Study Center collection, I happened on this grand dame of world cinema and mentioned my project. Although I cannot recall it verbatim, her reaction was a simple but provocative "Tsk, tsk ... the Brazilian cinema is in bad shape." I believe 'troubled' was another word she may have used. We chatted briefly, wished each other well and parted.

Two months, countless articles and historical texts later, I have emerged with a learned treatise, a researched, conclusive and unshakable truth: "Tsk, tsk ... the Brazilian cinema is, [as it has always been,] in bad shape."

A five week Fulbright excursion into the heart and mind of Brazil this past summer revealed a country very much in turmoil. Brazilian economics and politics were vying for the headlines with the soon-to-be world champion soccer team. While the Swedish, Italian, American and other teams were deftly dispatched by Brazil's finest, the national economy was experiencing a major overhaul with the introduction of a new currency that had already changed four other times since 1986. National elections were to take place a while after my departure, and the country was abuzz with confused expectation. This precarious state of affairs was countered somewhat by the seeming inevitability of the world soccer championship. This turmoil offers quite an opportune metaphor for the perpetual pandemonium that is the Brazilian cinema, one forever subservient to political and economic influences, and yet, through it all, often providing some prize-winning gems at film festivals throughout the globe.

Brazilian cinema is most often considered for its *Cinema Novo* movement that spanned the late fifties into the early seventies. This 'New Cinema,' akin to its contemporary French *Nouvelle Vague*,

> combined history and myth, personal obsessions and social problems, documentary realism and Surrealism, modernism and folklore. In mixing populist nationalism,

> political criticism, and stylistic innovation, *Cinema Novo* recalled the Brazilian Modernist movements of the 1920's... The young directors became a link between the western New Cinemas of the early 1960s and later Third World movements...[and were] far more politically militant than their counterparts in France, want[ing] their films to speak for the disenfranchised people of their country - the ethnic minorities, the peasants and landless laborers. Influenced by Italian Neorealism as well as the New Wave, the directors sought to record their nation's dilemmas and aspirations.[1]

The movement boasted such works as the neorealistic *Favella Times Five*, the Godardian *Vidas Secas*, and Glauber Rocha's auteurist *Barravento* and *Black God, White Devil*. They each have the gritty, hand-held, wide-angled feel of the best of their contemporaries in Western Europe, from Rossellini to Godard, and achieved a semblance of prestige in world cinema. One of the guiding tenets of the movement, incorporated from European filmmakers was the auteur theory:

> Most *Cinema Novo* directors followed Rocha in seeing the auteur theory as a vehicle of political critique. He considered cinematic authorship a reaction to the dominance of Hollywood; making idiosyncratic films was itself a revolutionary act."[2]

This tendency in itself reveals a major quandary that has plagued Brazilian cinema since the turn of the century. As documented by various historians,[3] Brazil has never been able to establish its own film product within its boundaries, while the foreign cinema, particularly the American, continually dominates Brazilian film exhibition. A minimal understanding of the Hollywood studio system from its early stages and on into its demise in the sixties can explain away the great attraction its product had over lesser industries... It was simply a far superior cinema. It was an industry devoted to a product aimed at its audience. Hollywood glitz and glamour were but a way of attracting and retaining its audience, but the bottom line was that Hollywood was a booming industry, with unions and guilds and other such industrial staples that ensured a continuous flow of product, with A films and B films equitably sharing the market. Such was never the case in Brazilian cinema. When indeed there were cooperatives and film commissions created to mimic the Hollywood system of industrialized filmmaking, the results were always, like much of Brazilian politics and economics, erratic at best, preposterous at worst.

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[1] Thompson and Bordwell, p 606.

[2] Thompson and Bordwell, p 608.

[3] Randal Johnson is one such historian who has written prolifically on the subject, and his books and articles are contained below in the bibliography.

One such cooperative, Vera Cruz Studios, was founded in 1949. Modeled after Hollywood's MGM studios,

> the idea was to create a "quality" cinema, ... [which] meant an elegant form of artistic expression designed to show that Brazilians too know how to make fine films and fine theater. It was to be an art, as Augusto Boal puts it, "made for the rich by the rich."[4]

A worthy attempt at emulating Hollywood's "dream factory," Vera Cruz produced a handful of films, including Cannes prizewinner *O Cangaceiro*, and consolidated the best actors, scenarists and directors that their substantial monies could buy, importing the best filmmaking equipment and technicians available. Much like its North American mentor, MGM, Vera Cruz "set up an expensive and luxurious system, but without the economic infrastructure on which to base such a system." [5] Without the distribution/exhibition mastery developed by MGM over its formative years, and of course, without such visionary and passionate businessmen/artistes as Irving Thalberg to guide it, Vera Cruz was doomed from inception, and went bankrupt in five short years.

Vera Cruz is here offered as but an example of the Brazilian cinema's often absurd attempts at developing itself into a force to be reckoned with. Always at odds with Hollywood product, it would constantly attempt at overcoming the Hollywood imports by questionable means. Import taxes and exhibition quotas were constantly being implemented and revised to stave off the Hollywood imports that overwhelmed the Brazilian industry. Unfortunately, this would invariably short-change the Brazilian movie-going audience in that they were forced to view lesser films, in turn increasing the popularity of the Hollywood product and creating a resentment and disdain for the national cinema. In trying to create a Hollywood in the rain forest, Vera Cruz, as well as its subsequent heirs, only succeeded in increasing the costs of production for the filmmakers and relegating their films to short and unsuccessful runs as part of the quota of national films exhibited. The exhibition strategy they employed, the questionable quota system,

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[4] Johnson's *THE FILM INDUSTRY IN BRAZIL: CULTURE AND THE STATE*, .p 62.

[5] Ibid.

forced theaters to screen Brazilian films for a legislated number of days in the year, regardless of how many films were produced that year or how they measured up in quality and entertainment values (Currently that figure stands at 140 days per year.)

Of the state policies governing the Brazilian film industry, the only beneficial policy seems that which stipulates the screening of a national short subject as part of each program of foreign films This policy, instituted in the early seventies, after the creation in 1969 of the enigmatic Embrafilme (the Empresa Brasileira de Filmes,) has spawned a popularity for short subjects, both animated and live action, that far exceeds the regard held for them in Europe or the United States A visit to Sao Paulo's Museu Da Imagem E Do Som in late July revealed the immense popularity of the short subject The Museum was gearing up for its fifth annual International Short Film Festival, and its very gracious program director, Ms Zita Carvalhosa, was eager for yet another successful year Although she was quite proud of the attendance figures in the previous years, I left the Museum without an inkling as to why a nation would more readily embrace the short subject and almost totally ignore its feature film industry In retrospect, it seems that when the moviegoing Brazilian public steps out for the evening, it enjoys the *Rambo's* and *Terminator's* with a short Brazilian appetizer, as per state legislation So, while the Brazilian feature is screened at a downtown theater, woefully empty but in compliance with the state policy, further down the block the theater featuring Sly or Schwarzenegger also offers the packed audience a short, palatable featurette made by a countryman and the taste becomes acquired thus

The short film has always been universally considered a feasible *IN* for the would-be filmmaker, and so it is, but, as with all things Brazilian, the Brazilian short film industry displays no such logic or reasoning:

> One of the most fascinating aspects of Brazilian short films is their versatility and the fact that they stem from a documentary tradition that is searching and revealing like Alberto Cavalcanti's work in the British documentary film school, that is lyrical like the films of Murnau, that has the poetic objectivity of Flaherty, and that knows the cinematic consciousness of Dziga Vertov The short films made in Brazil are the work of filmmakers already established with more than one feature, such as Gustavo Dahl, Geraldo Farno and David Nevez or of newcomers like Marcos Altberg [6]

During my short visit to the Museum, Ms Carvalhosa treated myself and my fellow Fulbrighter,

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[6] Fabiano Canosa in his notes for the BRAZIL CINEMA NOW program at The University of New York at Buffalo, May, 1979, p 2.

Nancy Mandlove, to a select screening of three very provocative shorts that confirms this 'versatility.' Along with a charming couple of shorts played for laughs, there was a stunning treatise on intolerance that uses the metaphor of material consumption entitled *Ilha das Flores* that was as moving a short as Alain Resnais's *Night and Fog* and as stylistically creative as any of the award winners from the likes of the National Film Board of Canada or Zagreb. Without the benefit of subtitles and Portuguese-illiterate, I was nonetheless floored by *Ilha das Flores*, such was the power of its images and its editing.

This is not meant to express surprise that a Brazilian film could be so mesmerizing. On the contrary, the body of works available in the U.S. is outstanding. It's just that we are privileged to view the very best of Brazilian cinema, (as is the case, of course, with all foreign imports.) For instance, the pornographic entries (pornochanchados or 'erotic comedies,') a major movement in the seventies, are not as available on video-store shelves, and yet these were the meat and potatoes of the Brazilian industry that generated the greatest national revenues and proved the most successful of the domestic releases for decades. This anomaly counters the American experience with the porn industry, in that the American pornographic industry was a subordinate appendage of the Hollywood experience, relegated to a peripheral role despite its great success. One of the attractions held by the pornochanchado, it would seem, was in its lack of pretensions toward high art and its greater accessibility to a Brazilian public unenamored by artistic affectations and unwilling to be reminded by Cinema Novo artistes of their 'dilemmas and aspirations,' their squalor, their subjugations and their national turmoil. If there was any overwhelming element of the national persona that I absorbed over the five weeks spent travelling across Brazil, it was the spirited refusal to succumb to overwhelming political and economic encumbrances and a unique acceptance of these quandaries as matter of fact. Hence, when a state commission such as Embrafilme trumpets its intent to:

> interchange Brazilian culture north and south, east and west, and to make it possible for all the people of Brazil to understand each other and recognize each other's true face and peculiarities. . . ,[7]

the general populace must surely react with amusement at the pomposity of such an ambition.

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[7] Roberto Farias, General Director of Embrafilme, in his statement of intent for the *BRAZIL CINEMA NOW* program at the University of New York at Buffalo, May, 1979.

Embrafilme boasts the longest life of any state commission and has undoubtedly provided some high points in Brazilian cinema, but its overall impact on the industry, in establishing the Brazilian cinema as a force to be reckoned with internationally, has been downplayed by most who have seen through the pretense.

> In an editorial titled "Cine catastrofe," the newspaper *Folha de Sao Paulo* referred to Embrafilme's activities as a "moral, economic and artistic disaster." Many film industry professionals recognized the need for a reevaluation of the relationship between cinema and the state. *Cinema Novo* veteran Carlos Diegues (*Bye Bye Brasil,)* for example, referred to the enterprise as a "cultural Medicaid system that treats cancer with bandaids."[8]

Julio Bressane, another noted filmmaker as respected as Carlos Diegues, specifies Embrafilme's deficiencies while at the same time seeming to take a potshot at Diegues:

> Embrafilme preserved and exacerbated all the defects of state enterprises: nepotism, malversation, overcharging, in sum, all the characteristics of an organized gang, and it thus chased the public away from the cinema and destroyed the market.[9]

It is noteworthy to observe that Carlos is the accomplished son of leftist Manuel Diegues Jr., an officer in the Departamento de Assuntos Culturais that oversaw all of the government's cultural enterprises. We in the States have had our Fondas, Bridges, Douglases, Stevenses and other such creative clans, but one does tend to wonder how young Carlos first landed work in the industry. After viewing his *Xica da Silva* ('76), *Bye Bye Brasil* ('80) and *Quilombo* ('84), the question is playfully rhetorical, but the nepotism seems undeniable.

To continue the comparison between the American and Brazilian industries, Hollywood had neither the benefits nor the seemingly substantial disadvantages of governmental or state influence. The American industry grew and prospered on its own and only felt the restrictive hand of governmental sycophants in the institution of the Hays Commission in the thirties with its sister absurdity, the MPAA, in the sixties, and the occasional legislation prohibiting monopolistic practices in the production, distribution and exhibition sectors in the thirties and forties. Otherwise, the American cinema has had a free reign to flourish on its own terms. When faced with the competition of television in the early fifties, it countered with 3D and the epic film rather than relying on governmental restrictions imposed on the newer medium; when the epic film passed its peak, along came *Easy Rider* and a return to the smaller production, which, in turn gave way to the blockbuster in 1975 with such extravaganzas as *Jaws* and *Star Wars*; the encroaching video phenomenon at first frightened the filmmaker, but eventually provided yet another lucrative exhibition format. All these developments were self-propelled and independent of any state or governmental interference... "And God said: 'That's good.'" [10] Yes, we do have to suffer the occasional slings and arrows of outrageous Stallone/Schwarzenegger spectaculars at the expense of the 'art' film, particularly in our current faze, but our horizons are perpetually open to alternatives. When we tire of the biceps, we undoubtedly will return to the 'little' film with a contemporary version of *Easy Rider*. The script is probably on someone's desk at this writing, awaiting its time. The American cinema, in short, is pliable. It is predicated on entertainment first and foremost. Had the pioneers sought to use the medium to express the horrors of turn of the century America, *The Great Train Robbery* might have been a discourse on the railroad's mistreatment of its laborers. Chaplin may have replaced his great pathos and humanity with overbearing indictments and political diatribes ala Sergei Eisenstein or other such frantic filmmakers.

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[8] Randal Johnson in *IRIS*, p 108.

[9] Randal Johnson in *IRIS*, p 107.

The Brazilian cinema was never predicated on entertainment by and of itself. That, alas, has proven its achilles heel:

> In his seminal 1963 book *Revisao Critica do Cinema Brasileiro*, Glauber Rocha aligns himself and the [Cinema Novo] movement with the French *Nouvelle Vague* and its struggle to free itself from the rigidity of industrial cinema and its norms, while at the same time politicizing the *Nouvelle Vague*'s concept of auteur. The auteur, according to Rocha, revolts against the mercantilist mentality of industrial cinema, which puts profitability and easy communication above art. Rocha proposed an opposition between "commercial cinema," equated with illusionistic technique and untruth, and "auteur cinema," characterized by freedom of expression and a dedication to truth. [Brazilian cinema] thus rejected the studio system...as being dedicated by definition to the falsification of reality. [11]

And that, in the proverbial nutshell, seems the reason the Brazilian cinema still struggles. Once again, it is important not to lose sight of the occasional gem that emerges from this state of state-supervised cinema, but one worries about the eventuality of the toddler ultimately taking its first autonomous steps. Akin to the socialist realist films of the Eastern European communist block countries such as Czechoslovakia, Hungary and others who were provided government funds to portray the communist doctrine in a favorable light, the government-backed Brazilian cinema takes its funds and proceeds to comply with governmental expectation The occasional transgressive voice will indeed emerge, get by the censors and provide provocative entertainment, just as the Eastern European cinema displayed some provocative imagery beneath a guise of communist rhetoric and quite often emerged with a laudable body of artistic works that rivals any of the 'free' cinemas However, in light of a recent gathering of Eastern European filmmakers at the New School in New York City in mid 1993, one wonders The overwhelming sentiment expressed during that particular seminar by Czechs, Bulgarians and Hungarians alike was the lament over a lost creative period in which filmmakers were wonderfully challenged and defied to express their dilemmas in the most provocative manner When communist oppression and funds were removed from the picture, the result was an empty canvas, a dearth of materials and ideas Filmmaker after filmmaker bemoaned the absence of communist adversity to provide their ideas and 'punch'

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[10] With fond apologies to James Weldon Johnson and the oft-repeated line from his poem, "The Creation."

[11] Randal Johnson in *IRIS*, p 111.

Disguised as a fictional recreation of the Portuguese diamond industry in the state of Minas Gerais in 18th century colonial Brazil, Carlos Diegues's *Xica da Silva* is an apt example of the power and 'punch' of the Brazilian cinema at its most spirited and transgressive Centering as it does on a heroine who overcomes her position as slave by using her body and wiles, this "carnivalesque celebration" [12] of the indomitable Brazilian spirit transcends its costume drama setting and provides just as strong an indictment of contemporary social ills as it does of 18th century slavery After travelling across the country, even for as short a period as five weeks, one is struck by the vast difference between the classes The impoverished favella dweller resides a stone's throw from the wealthy Rio denizen, and the road-building rubber/robber barons of Manaus partake of their grand opera house while indigenous Amazonians succumb to their greed Xica sheds her slavery only to enslave others, and her plight seems to mirror contemporary Brazilian politics and society in such a way as to recall the finest of American entertainment *Xica* suffers not from Cinema Novo pretensions of social commentary exclusive of entertainment, as it develops the highly entertaining narrative of the Brazilian spirit overcoming its oppressive Portuguese sovereignty in the 18th century while alluding to that same spirit in the 20th century and prompting the viewer's accusatory fingers at the contemporary powers that be Director Diegues himself recognizes this need for his films to portray beyond the obvious

> Cinema is not the reproduction of reality It implies the creation of a parallel, alternative and versimilar universe This versimilitude nourishes itself more on the

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[12] Johnson & Stam's *Brazilian Cinema*, pp 216 - 224.

> spirit and ideology of the spectators than on their daily experience.[13]

A beneficiary of state funds through Embrafilme and a filmmaker schooled in the Cinema Novo movement of his formative years, Diegeus curiously counters the sentiments of Rocha and his ilk and puts his finger on the frail pulse of the troubled Brazilian film industry in this statement of the obvious (to American filmmakers and scholars at least.) It seems most unfortunate that the "spirit and ideology of the spectators" has received so little regard, and the proof of the failure of the Brazilian cinema to do so lies in the "drastic decline in the number of theaters in operation in the country, now slightly over 1,000 for a country of 140 million."[14]

Lacking as I am in the numbers of theaters available to the American populace, I can offer but an anecdotal coda as to the state of the Brazilian cinema as I witnessed it just a few days before my departure. Visiting the Cinemateca in Rio's Museu de Arte Moderna under the cordial hospitality of its coordinator, Ms. Suzana Schild, I was given a tour behind the scenes of the curatorial grounds. Having myself worked for five years in the Film Department of NY's Museum of Modern Art, I was utterly amazed by what I witnessed. Whereas NY's MOMA stores its films in a separate storage facility outside of the city in facilities especially geared for self-combustible nitrate film stock and refrigerated rooms to prevent the fading of color film stock, the Cinemateca's film storage is behind the offices and woefully near the auditorium where filmgoers enjoy screenings of programs as diverse as Jean Renoir and Walter Lanz. Films of various stocks are stacked precariously up to the rafters in near crawlspaces that can only be traversed in single file by a lightbulb-brandishing curator and his three curious guests.[15] A separate room devoted to publicity materials such as one-sheet posters, lobby cards and production stills had few storage cabinets and was inundated with materials yet to be identified and catalogued and strewn about the room in disarray. Ms. Schilds informed us that student volunteers were currently working on the cataloging of these materials, and the process was painfully slow as state funds were not supporting the project. The screening room that held some 150 patrons was a commendable facility, acoustically sound and quite the comfortable 'art' house, but Ms. Schild further bemoaned the fact that while some programs are advertised sufficiently and draw a sizeable crowd, others aren't and screenings catering to a dozen people are commonplace Although Ms Schild and her staff are extremely dedicated and concerned curators, the state of the Cinemateca seems, to borrow from Adrienne Mancia's curatorial acumen, "in bad shape "

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[13] Johnson & Stam, p 216.

[14] Johnson in *IRIS*, p 111.

[15] Joining me on this 'adventure' were Professors Nancy Mandlove of Converse College and Emilio Rodriguez, political scientist at Mount Saint Mary's College. My fellow Fulbrighters seemed as enthralled as I by the site, and one might seek their responses to the visit for further details.

In speaking at length with Ms Schild, it seemed apparent that this treatment of the Brazilian cinematic heritage was but a logical extension of the state-sponsored industry itself Although talented filmmakers and impassioned curators abound and fervently strive to produce and preserve their cinema, they are faced with the sort of bureaucratic governmental and state handicaps that have always afflicted the Brazilian cinema

Endistanced by nearly five thousand miles, curator Schild would readily agree with her counterpart in New York in assessing the Brazilian cinema as "Tsk, tsk in really bad shape "

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REFLECTIONS ON THE RELATIONSHIP BETWEEN BRAZILIAN COMMUNITIES AND THE ENVIRONMENT

by John G. Clark
Fulbright Seminar on the Brazilian Environment
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An overall objective of the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992), as expressed in Chapter 7 of Agenda 21, "Promoting sustainable human settlement development," is "to improve the social, economic, and environmental quality of human settlements and the living and working environments of all people, in particular the urban and rural poor." The operational areas of this program included: adequate shelter for all, sustainable planning and management, infrastructure development, from water supplies to sustainable energy, site-specific policy formulation, modernized construction techniques, and human resource development and capacity-building.[1]

At the second annual meeting of the United Nations Commission for Sustainable Development,[2] the report on human habitats was highly praised. A closer reading of the documents revealed praise aimed at descriptive content, not praise for the report's analytical or ameliorative qualities. Nothing new had ensued since 1992. CSD repeated Agenda 21's prescriptions for more widespread access to freshwater and for improved waste disposal.[3] These old formulas offered feeble hope to countless millions who, around the globe, flocked to cities, found little work, and lived in slums teeming with people. Estimates of global population for 2025 range from seven to nine billion, a substantial rise from the five billion in 1990. Of the increase, 90 percent will occur in the Third World and 90 percent of that will take place in cities.[4] Concomitantly, depopulation and/or stagnant economies threaten well-being in rural communities.

Brazil's evolving demographic configuration and the condition of basic public health-related utilities in Brazilian communities reflects, in both positive and negative ways, trends throughout the world of developing nations. In Brazil, now containing the world's largest and 14th largest cities, respectively Sao Paulo and Rio de Janeiro, the urban population as a percentage of total population advanced from 50 percent in 1965 to 79 percent in 1994. By the latter date, 41 percent of Brazil's people resided in cities exceeding 750,000. Sao Paulo, with a population somewhere between 18 and 23 million, and Rio de Janeiro, with a population between 11 and 14 million, were truly megecities. At least eight other cities contained in excess of one million.[5] Sao Paulo, alone, accounts for almost ten percent of the nation's population.

How do people fare in such diverse urban settlements as Sao Paulo, Rio de Janeiro, Salvador (2.5 million), Brasilia (1.5 million), Manaus (one million), and Carajas (8,000)? Gross statistics are at best suggestive and at worst misleading . For example, according to World Resource Institute sources, 95 percent of urban Brazilians have access to safe drinking water and 84 percent to sanitation. These figures are not congruent with an infant mortality of 57:1000 live births and an under five mortality rate of 69:1000. Many of the vectors of the typical diseases that plague Brazil are associated with wastes and contaminated water. In the Sao Paulo metropolitan region, the final disposal of almost 20 percent of household wastes is considered inadequate. Of 4,425 Brazilian communities reporting, 96 percent operated a water supply system but only 47 percent managed a sewage system.[6]

In rural areas, in small settlements or villages and towns, and in the outlying areas of major cities, access to adequate sanitary utilities diminishes. In 1990, 60 percent of rural people were provided with safe water and 32 percent received sanitation services. Health services lagged behind in the more rural areas as did, for example, educational opportunities. Thus, the more rural and less developed North, South, and Central West generally possessed fewer educational, water, and sanitation facilities than did the Northeast and the Southeast, the latter region containing about 70 percent of the entire population.

Gross inequities characterized the allocation of quality of life services in Brazil to a much greater degree than in the United States, Canada, Western Europe, or Japan. In Curitiba, heralded as a progressive city in environmental matters and considered as a model for its recycling initiatives, only 40 percent of the residents were hooked to sanitation services, the waste water treatment plant was obsolete, and few drank tap water.[7] A thick layer of smog veiled Curitiba and most other places located in the heavily industrialized southeast.

Cities in the United States and Western Europe developed extensive low income and slum areas as they industrialized during the nineteenth century. In sections of New York City, London, Cologne, and Paris, infant mortality rates before World War I frequently exceeded 100:1000 live births. High-tech public utilities radically reduced these rates during the Twentieth Century. Now Brazil is engaged in a similar campaign. In the West, the combination of gradually spreading democratic practices and rising purchasing power among working class populations encouraged the population to demand effective public services. The poor have not been eliminated in the West, but, and far more than in Brazil, the poor have become integrated, if imperfectly, into the social service system--public health, energy, transportation, social security.

In Brazil, ruled by a narrow elite that has managed to accommodate to either military or civilian rule, that reaps benefits from inflation or deflation, and that functions successfully in a global economy, the incentives to share goods and services are lacking. As Bertha Becker stated forthrightly, the privileged are the state.[8] The privileged direct attention to economic development characterized by large scale and polluting projects and low-paying non-unionized jobs. On the environmental front, various agencies focus attention on the reduction of air pollution. The guest speakers appearing before us in Sao Paulo devoted virtually all their presentation to describing efforts to control industrial emissions into the air.[9] Through command and control systems, firms can be forced to install devices that lower air pollution levels at no cost to the authorities, local, state, or federal. This is not true for water, soil, and waste disposal.

A thick, irritating pall of smog hung over Sao Paulo, a city containing ten percent of the national population and producing 40 percent of national GDP. Sao Paulo's industrial complex, extending over the rain forest-covered mountains to Cubatao, claims first place in Brazil for size, diversity, and productivity. Until 1986, industrial development in Sao Paulo proceeded uncontrolled as the military government sought a quick return on investments with no concern for natural resource use or the environment. Air pollution became endemic, worse than the worst U.S. or European cities. Efforts to diffuse industrial plants to the northwest interior of Sao Paulo State succeeded marginally. Firms continued to locate within the city of Sao Paulo and its metropolitan hinterland. Within the city, and on both sides of the coastal range, air pollution concentrated.

Air pollution, at the least, contributed to respiratory illnesses among a poor and growing population. Acid deposition wreaked havoc in the Atlantic rain forest, causing serious erosion, floods, mud slides, and sedimentation in rivers. On the sea side of the slopes, above Cubitao and its heavy industries, whole mountain sides are brown.

The smog cloud above Sao Paulo is stationary. However, officials claim to have reduced by 90 percent the volume of industrial air pollution in Sao Paulo State. But, automobile emissions have increased as more people and more autos crowd into the megacity. Between April and July 1994, 12 air pollution emergencies were declared, involving CO, O, and particulates. Moreover, the sanguine account of reduced industrial air pollution offered by the authorities ran counter to the remarks of an English engineer who manages pollution abatement equipment at a large multinational thread factory. According to this individual, General Motors, an employee of 35,000 workers, refuses to comply with air or liquid emission standards. He suggested that GM will fight enforcement by threatening to cease operations. Surely other polluters pay but nominal obeisance to regulations. Sao Paulo's force of pollution inspectors is small. The Englishman wondered: are they all immune to the influence of powerful corporations.

What I saw, smelled, and felt leads me to doubt the effectiveness of Sao Paulo's efforts to bring industrial air pollution under control. Small firms are innumerable in Sao Paulo, engaged in various polluting activities. Dye makers, small metal shops, cleaning establishments, food processing firms, and so on are hardly manageable given the slim resources environmental protection agencies receive. A campaign to control vehicular emissions has hardly begun. Sao Paulo's noxious cloud will continue to thicken.

Our guests paid minimal attention to water and soil contamination. A water source police does function within the Forestry and Water Source Command. Apparently, this group operates mostly within the forests rather than as a regulator of industrial waste disposal. Within the city, the Rio Tiete is thoroughly polluted. A comprehensive Tiete River Depollution Program established by the Sao Paulo State government intended to reduce river pollution by 50 percent by 1994. Available material failed to enlighten concerning the success of this significant

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initiative.[10] In appearance, the Tiete is filthy and odorous.

Household waste accounts for 70 percent of Tiete River pollution.[11] In the master plan, the intent is to collect and treat drainage before it enters the river. Into 1994, some new treatment stations have come on line. But, since the inception of this multi-billion dollar program in 1991, some 1.6 million new producers of waste have moved into the city.

Many of the newcomers crowded into new or threw in their lot with old favelas. The seven lane highway from the Sao Paul airport to the city follows Rio Tiete for a considerable distance. Favelas abut this road, the dwellings flush with the inner most lane itself and often continuing under bridges and other permanent structures. A stone's throw from the Rio Tiete, unconnected to any utilities, the liquid waste of these thousands drain, finally, into the Tiete.

In Sao Paulo, Curitiba, Salvador, Rio de Janeiro, and other Brazilian cities, favelas,large and small, house scores of hundreds of thousands of people. In Sao Paulo, according to the English thread factory manager, most of his 3,500 employees are favela residents. Most workers earn, he readily admitted, the minimum legal wage---why start a factory in Brazil if the wages are the same as in Manchester or Detroit? In Brazil no legal housing exists at the margin. Favelas are the folk response. People moving from rural to urban Brazil seized the empty ground, wherever it was; in eroded and littered valleys and ravines in Salvador, on the edges of dry land and over wet land in Manaus, clinging to the steep slopes in Rio de Janeiro. Choices for these poor migrants are essentially non-existent.

Favelas lack even rudimentary sanitary facilities. In many, enterprising people have illegally tapped into the electric grid and have a single light in their otherwise anti-modern dwelling. Across the way from a candomblé meeting house in Salvador, the lights went on as night fell and everything looked normal and twinkling. But, having seen during daylight that concentration of tar paper-zinc and tin sheets--old boards--cardboard--and sundry materials, cobbled together into a flimsy structure, housing 3,4,5,6,7,8...people, I knew it to be anything but an ordinary community or neighborhood.

Brazil contains too many people. A political and economic system perpetuating the maldistribution of resources guarantees that virtually each additional person will command far more or far fewer resources than necessary to a life of dignity. In the U.S. the middle class dominates numerically and offers a visible and achievable goal for those below. During the nineteenth and twentieth centuries, the vast industrial-urban machine in the U.S. absorbed countless millions, not without loss, and in two or three generations transformed Serbian coalminers or Italian tile workers into solid middle class citizens. Racism mandated that only the blacks be denied the chance to move up the social ladder. Only in the 1960s did civil and economic rights open up opportunities for some blacks and other racial minorities. In Brazil, the myth of a raceless society blinds the leadership to the blatant racism that exists. This in a country without the job-creating machinery that permits rapid population growth and fosters the emergence of a middle class society. The favelas are the absorber of newcomers in Brazil.

In Rio de Janeiro, some number between 300,000 and 400,000 live vertical lives in the steeply inclined favela of Rocinha. These folk, about the same number as in the city of St. Louis, live in an area that the eye can fully encompass from no more than a few hundred yards away. Other Rio favelas rise even more precipitously, one the *Morro do Encontro* is contiguous with and intrudes upon a state forestry preserve. Reforestation programs there, and similarly in Sao Paulo's *Parque Estadual da Serra do Mar* where hundreds of squatters actually occupy park lands, are impossible. Whatever stands in the way of favela expansion is removed, whether a new seedling, a boulder, or an authority.

In the park-land favela, clandestine hunting, fishing, and wood gathering occur regularly; in more inner city favelas, drug businesses and other rackets are a normal part of the scene. In Rio, Mafioso style gangsters extort protection money from street vendors. At Rocinha, our departure was marred by a police action in which some 20 men, armed with automatic weapons, made their way carefully house to house, backs to the wall and eyes on the windows and doors of the opposite side of the street. Was it a drug bust? normal police harassment? When the police appeared, the people down below set off firecrackers to warn the people up above. This reminded me of the original theme of some *capoeira* rhythms which warned the slaves of the master's approach. Rocinha, far larger, older, and apparently better organized than most favelas remains disconnected from the city system, in a netherworld characterized by both abject dependence and dignified autonomy.

One or two professional social workers provide a bare minimum of services to these hundreds of thousands. On Saturday, a dentist and a physician appear to examine people during the morning. The day care center for infants and adolescents--creches--receives no government funding whereas those "in the city" do. Rocinha, averred its young, Rocinha-born social worker, enjoys no political leverage. In Ipanema, a rash of muggings will assure more police on the streets around the hotels and beaches, not so in Rocinha. The girl from Rocinha does not command the attention lavished on the girl from Ipanema. To obtain handouts from the city--to buy a used van or add a communal faucet--Rocinha must refrain from organized agitation for services and rights.

At the top-most layer of Rocinha congregate the newest and poorest residents. The higher you go, the more primitive everything become and the further one must haul water. In the older sections, raw sewage runs through constructed, if open, channels. Up above, the sewage flows freely, obeying the law of gravity, following the path of least resistance, carving out gullies and ravines, making its way under and through homes to the great mother of open sewers at the bottom, and from thence, via a nameless stream, into the sea. Deaths occur as rain storms wash out people on slopes shiny and baked and stripped of vegetation. The smell, from top to bottom, overwhelms the senses[12]

How this place, this teeming vertical hive, maintains order and decorum symbolizes the potential of Brazil, the wealth of its human resources, now squandered, corrupted, if not dehumanized, in these viral and bacterial nightmares. The residents of Rocinha have evolved a set of informal rules that establish some predictability of behavior. How people act, what is permissible, how space is used, all must be worked out over time and communicated to newcomers. Somehow, the inevitable deviants must be confronted. In some favelas, pathologies may have triumphed; in Rocinha, this did not seem to be the case. Many days after Brazil's victory in the World Cup, the yellow, green, and blue streamers remained above many of Rocinha's pathways, strung from roof to roof and pillar to post, reflecting a strong love of country. Some version of the common good idea seems alive, if threatened, in Rocinha.[13]

Jaime Benchemol, historian of Rio de Janeiro, portrayed a city government so thoroughly corrupt as to infect the the moral fiber of the citizenry with the germs of decay.[14] Undoubtedly, the forces of good and evil clash in Rocinha, as in neighborhoods within sight of the seat of the U.S. government in Washington, D.C. How long the common good can be sustained against the despair of people without hope, against the assaults of the criminal, against the myopic indifference and egocentricity of the elites defines the primary social issue, not only for Rocinha but for the whole of Brazil.

Rochina and Carajas, the former a fall of sewage above which live dignified and hard working individuals, the latter, owned and financed by the *Companhia Vale do Rio Doce*, the patriarchal owner of the world's largest iron ore mine, filled with dignified and hard working individuals. How different from sterile Brasilia and gross Petropolis, former seat of the Brazilian empire.

On the road north from Rio de Janeiro to Petropolis, the landscape is littered with debris and the waterways thick with oil and sludge, and both wholly polluted. What looked to be worker housing adjoined a huge Petrobras refinery. ESSO and Texaco installations, punctuated by small manufacturing plants, miniature favelas, and derelict buildings finally blended into deforested hills, scoured by mud slides. People survived in this jumble. Political graffiti enlivened otherwise ugly, bare and flaking cement walls. What a relief to attain the higher hills and then the coastal mountain range.

Petropolis, home of Pedro II's palace and the homes of contemporary rich, appeared to be a parasitical city. Nothing in the city's history contained redeeming moral value or pointed toward a hopeful future. Its story is one of slavery and decay. Brasilia, a new, sterile, characterless city, sits in nowhere, unattached in any vital way to the remainder of the nation. It is the seat of a moribund government. Its claim to fame is that after dark it looks like an airplane from the air.

The miners of Carajas, the foresters of Sao Paulo and Rio de Janeiro, the botany faculty of Salvador's technical university who oppose devastation of the rain forests and seashore to the north, the workers in Rocinha, the young lifeguards on the beaches of Ipanema, call for equity, justice, and democracy. These priorities have intrinsic value. These priorities stand in vivid contrast with the development objectives of well-placed Brazilian officials and their allies and sponsors from the developed world. Official priorities concentrate on such megadevelopment projects as canals transecting the Pantanal. Such goals make less sense than improved wages, progressive taxation, a stable currency, and the construction of a solid public health infrastructure.

Economic and environmental experts such as Haroldo Matto de Lemos emphasized management strategies such as environmental zoning to control resource use. but will such technocratic devices prove beneficial to Rocinha's workers and unemployed? If the resources of the Amazon are employed in a way that minimize environmental damage, will this bestow wage and service benefits on the people of Manaus? At Itaipu a massive reforestation project will line the Brazilian side of the great lake with trees and restore original habitat. How will this benefit anyone that is poor? This forest barrier will act as a sponge for the chemical runoff of nearby farms. A better strategy would be to reduce the application of fertilizers and pesticides and apply research skills to natural protection and nutrient transfer.

Mattos de Lemos criticized the Brazilian constitution of 1988 as rights based and obligations deficient, often the refrain of those with power who fear those below who seek power.[15] In my view, an environmental ethic can only evolve from a democratic base rooted in rights but there is no assurance that democracy will generate such an ethic. Still, we have no choice, but must be democratic if we are to have a fighting chance to build a humane and sustainable world.

Rocinha, its smells, its crime, its stalwartness, its vitality, makes demands that stand as the political bell-wether of Brazil. The needs of this community are apparent to all who see clearly, are incontestable in their urgency and legitimacy, and are representative of the needs of a vast majority of Brazilians. Good faith efforts to respond to the imperatives of Roçinha might signify a hopeful future for Brazil. Further indifference will reap the political and environmental whirlwind.

endnotes--John G. Clark

1. Earth Summit Agenda 21. The United Nations Programme of Action from Rio: NY, UN (1992),p. 52.

2. CSD was created by the UN in early winter 1992 to monitor the compliance of UN members with Agenda 21.

3. Earth Negotiation Bulletin, 5.25 (1994).

4. World Resources Institute, World Resources 1994-95. A Guide to the Global Environment. NY, Oxford University Press (1994), pp. 267, 286-7.

5. Figures from ibid., pp. 286-8 are ballpark only. None in Brazil can provide an accurate count of the largest cities. See also, Instituto Brasileiro de Geografia e Statistica, Brazil in Figures. Rio de Janeiro (1992), p. 21.

6. WRI, World Resources, p. 273; Secretariat for the Environment, Sao Paulo, Sao Paulo 92: environmental profile and strategies, Sao Paulo, Secretariat for the Environment (1992); IBGS, Brazil in Figures, p. 30.

7. Information obtained at the Free University of the Environment, Curitiba. Curitiba seems to be a research center for the study of relationships between the height and shape of urban buildings and the microclimate of a city, see A. Goncalves Junior and F. Carstens, "Permeabilidade Vertical," Universadade livre do meio ambiente, Documento, 15 (1994), pp. 1-3.

8. Bertha Becker presentation in Rio de Janeiro, July 27, 1994. Professor Becker is Professor of Geography at the Federal University of Rio de Janeiro.

9. Speakers from the State of Sao Paulo Secretariat for the Environment and the Environmental Sanitation Agency (CETESB), and Secretariat for the Environment, Sao Paulo 92.

10. Forestry and Water Source Police, SP ECO 92, Secretariat for the Environment...pamphlet; Tiete Project, Special Commission for the Rio Tiete Depollution...pamphlet.

11. ibid.

12. J.G. Clark journal, July 28-29, 1994. See also, Uniao Pro-Melhoramentos dos Moradores da Rocinha, Varal de Lembrancas. Historias da Rocinha, Rio de Janeiro (1983) which would reveal much to me had I the ability to read Portuguese.

13. Reading some days later in John Updike's, Brasil, I encountered his version of the "politics of space" in a favela.

14. Jaime Benchemol presentation, July 27, 1994.

15. Remarks of Haroldo Mattos de Lemos, an official in the Federal Ministry of the Environment and former deputy director of the United Nations Environmental Programme, Rio de Janeiro, July 27, 1994.

A PROGRAM FOR

FRESHMEN LIBRARY ORIENTATION ON THE COUNTRY OF BRAZIL

Susan B. Coppola
Canton High School
Canton, MA 02021

OBSERVATION: pages 7 and 35 are missing. Maybe only a pagination error, or indeed two pages have been left out.

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A Collaborative Library Orientation on Brazil

Freshmen entering high school require a substantial training in library skills to meet the demands of research at this new level. Low budget funding for middle school libraries confines research often to an encyclopedia and one or two news weeklys. High schools, traditionally better funded, have access to larger more up-to-date materials.

With the explosion in information technology, access can now be a modem connection away... to online databases and to the internet with its worldwide computer resources and its people networks. Libraries, public and school, college, and government, are in the process of hooking together to offer access statewide. This curriculum program is an initial phase to introduce important information technologies to freshmen. Subsequent lessons will teach online database searching, other online service access, e-mail, and the other worlds of the internet: the door into information cyberspace.

This program includes a block of time for research, support and collaboration by a core of teachers, and an educational opportunity for students and teachers to learn together. Brimming with zeal after a five-week environmental trip throughout Brazil sponsored by The Center for International Education, U.S. Department of Education, I wish to foster an appreciation for the Brazilian culture and an awareness of the problems of the country's rain forests.

By sharing the responsibility for the unit, teachers will have a reason to improve their computer searching skills and their knowledge of the collection. With teachers present and involved a great deal of individual attention can be provided for students. The Rainforest Action Network's (RAN) eighth annual awareness week provided the timing and the impetus to share my education provided by the Fulbright-Hays Summer Seminars Abroad program.

Planning Sessions *Four weeks ahead*

All freshmen English, social studies, science, and art teachers are asked to attend a short meeting to talk about a project to **co-teach** library skills to freshmen to prepare them to do research and to write reports.

The outline for the project is explained and an offer to train each teacher, through individual appointments, on the use of computerized library catalogs and CD ROM databases is made.

An explanation of the relationship of Brazil to each of the curriculums is made:

The science curriculum studies world ecosystems and their relationships with global life-support systems.

The social studies curriculum by its definition examines the interrelationship of forces within a country that ultimately affect the global community.

The English curriculum studies Latin American authors and report writing.

The art curriculum seeks out ways to display students' talents and explores applications in various mediums.

Overall Objectives:

Students will use CD ROM databases to satisfy information needs.

Students will use the computerized catalog to locate materials.

Students will make use of background information for topic selection.

Students will learn from a wide range of materials in different formats.

Students will demonstate knowledge of Brazil through a report.

Teachers will use CD ROM databases to meet their own and students' information needs.

Teachers and librarians will have practice in collaborative teaching.

Skill Identification

Computerized catalog searching
CD ROM database searching
Locating materials in a classification scheme
Following a set of written directions for a paper
Information gathering from materials in all formats
Equipment use for presentations
Report writing skills
Cooperative learning

Timetable

All classes will meet during World Rain Forest Week.
Art teachers and students plan window scenes of a tropical rain forest and paint windows.
Science classes study the rain forests of Brazil. **Day one**
Social studies classes analyze the political, economic, historical, and social aspects of Brazil to understand the deforestation of the rain forests and select a topic for a report. **Days two and three**
English classes research information to write a report.
Days four five six

Library Environment

The physical space of the library area is transformed into a tropical rain forest to increase awareness of the vanishing rain forest systems and to promote a sense of fun and belonging for the new freshman class. Decorations include real rain forest plants (Benjamin ficus, ferns, orchids, bromeliads, anthuriums, spathiphyllums, impatiens, hibiscus, schleffleras), posters, pictures, videos, audio and CD recordings, animals, vines and crepe paper hangings, books, magazines, water music, window tropical scenes, humidifiers....

School Awareness

The entire school will receive information daily about the rain forests over the public address system throughout World Rainforest Week- October 15th -23.

Initial Stage

Materials are purchased. Deposit collections are borrowed from library consortiums for a six week period. Local Brazilian community areas and stores are visited Information is sent for from the Brazilian embassies. Local science museums are visited for their rich sources of information on rain forests and for artifacts from either their lending libraries or stores(Boston: Museum of Science). Local zoos with rain forest exhibits are contacted to collaborate with schools through materials and speakers from their education departments.(Boston: Franklin Park Zoo) National and international environmental organizations are asked to provide materials and ideas with different view points.

Scenes of the rain forest are painted on available windows by art students. Tempera paints with liquid detergent adhere well and are easily removable.

The library is decorated. Displays are put up. Bulletin boards outside the library are done. New and borrowed materials are added to the online catalog.

Opening Day the staff is invited to a breakfast of Brazilian coffee and hot chocolate, fruits (papya, guava, persimmon, banana, mango, passion fruit, oranges, tangerines, figs, pineapple), fruit drinks (Cashew, orange, papya, coconut, guarana,) with Brazilian bossa nova music and sounds of the tropical rain forest playing.

The **first day's** rain forest **announcement** is read over the school public address system.

Library Program: Day One

Freshmen *science classes* and their teachers.

PURPOSES for lesson:

The high school library's importance in a student's education. The difference between the roles of the school and the public libraries.

Multimedia materials for information and for presentations.

Rain forest background information for report topic selection.

LESSON

Students are invited to wander through the library rain forest to learn about this ecosystem.

Purposes for the integrated orientation and the lesson are discussed. **Handout** listing purposes for the orientation and rules of the library.

Description of what a tropical rain forest in Brazil looks like and how it functions as an ecosystem are explored. **Overhead** of a map of Brazil and its rain forests. **Pictures** illustating the diversity of life of the rain forests.

The various **plants** of the library rain forest and their leaf structure are examined.

The concept of biodiversity and the web of life are explained.

The first four minutes of the National Geographic **video** *Rain Forests* is viewed to introduce the creatures of the rain forest, the thinness of the soil, and the recycling of the nutrients in this biome. The tape is stopped at the description of the poisonous dart frog.

Without discussion a five minute segment of the National Geographic **video** *Amazon: the Flooded Forest* is played to understand the seasons, the flooding of the Amazon Basin, the indigenous peoples, slash-and-burn farming, the origin of the South American continent and the redirection of the Amazon. The tape is stopped when the scientist appears. Students are offered opportunities to view the remainder of the videos during study periods.

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The topic of how the rain forest benefits people through the world is discussed. **Colored Xeroxes** of foods, medicines, raw materials, biodiversity, winter haven for birds, greenhouse effect)

The accumulated wisdom of the indigenous peoples of the rain forest is examined through the eyes of scientists living among these peoples. Segments of the video *Spirits of the Rainforest* are played.

A discussion of the interdependency or balance of life is addressed.

Chico Mendes, the martyred rubber tapper and his plight with the large cattle ranches is discussed.

The causes of the deforestation of the rain forests. (farming, cattle ranches, mines, logging) and its effects on the lives of all (erosion , CO2 build up, habitat loss, global warming) are discussed.

Solutions in the way of sustainable development are needed. Students will pair up for the remainder of the period to find ways around deforestation using the materials spread around the library rain forest. Students are to pass in 3X5 cards with ideas discovered through investigation. **A list** will be made and hung up for the next class.

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The **second day's** rain forest **announcement** is read over the school public address system.

Library Program Day Two

Freshmen *social studies* classes and their teachers

PURPOSES for the lesson

Knowledge of sustainable development ideas in the rain forest.

Interrelationship of a country's economy, politics, history, resource.

Background information as an important part of a report.

Multimedia materials for information and presentations.

LESSON

A review of ways to save the rain forests of Brazil is discussed using one of the conceptual mapping diagrams to bridge old and new information and to model the practice of brainstorming as a important part of a report. **Overhead** sheet with a conceptual mapping diagram. An explaination of overheads and their production, colored and plain, is made and their availability to students. Equipment that can be used for presentations is explained.

Students are asked to select a preliminary report topic. The report assignment is passed out. **Handout** of report assignment.

An overview of why study Brazil is examined. **Color Xeroxes** of wildlife preserves and biodiversity, cultures, rivers, mines, trade products, history,nature of the people,and future global role. **Artifacts...Mineral Ore Butterflies Batik Scenes....**

Brazil's size, government, five major regions, climate and time zones, population, history, language, communications are discussed briefly. **Overhead Maps** illustrating these elements.

To experience the Portuguese language and to view scenes from the weekly news, especially scenes of families and teen age life, the weekly video *Brazil Update Weekly* is shown.

The major problems of the country: poverty: unequal distribution of wealth, homeless children, urban growth problems; inflation: underground economy, tax revenue, confidence in the government, currency change; foreign debt are analyzed. **Statue of migrating family** as a symbol of rural to urban migration. **Old** and **new currency color xeroxes**.and **video clips** of favelas.

Students are asked again to select a report topic drawing from their increased background knowledge.

To develop and reinforce background knowledge of Brazil still further a **slide presentation or video** on Brazil is shown.
During the visual presentation students are expected to jot down four or five ideas that *interest* them for a report topic. The importance in a report of gathering background information from all types of materials and selecting topics that parallel interests or future goals.

Students are to think about a topic for a report and to use the remaining time in the period to explore the books, posters, maps, photos, plants. Students will be expected to choose a partner to work with.

The **third day's** rain forest **announcement** is read over the school public address system.

LIBRARY PROGRAM Day Three
Freshmen *social studies* classes and their teachers

PURPOSES for the lesson

Dewey Decimal system arrangement of school and local public libraries.

Answers to questions on Brazil found in the reference or circulating collections.

Computerized catalog searches and CD ROM database searches

LESSON

A comparison of the organization of the Dewey Decimal Classification system with the development of man is explained:
100's Who am I? (Philosophy); 200's Who made me? (Religion and myths); 300's How will I live with others? (Social Sciences); 400's How will I speak with others? (Language); 500's What do I know about my world? (Sciences); 600's How will I apply this knowledge? (Applied science and technology); 700's How will I develop myself? (Arts, sports); 800's What can I say about all this? (Literature); 900's Where can I go and what is the past of what I see? (Travel and history); **Overhead** and **Handout** of the Dewey Decimal scheme.

Students are asked to pair up to work together to find materials in the library using *only* the handout not the computerized catalog. **Questions** to groups are passed out or chosen by students. **Overhead** with examples to analyze questions into two parts:what *information* is *given* and what *information* is *needed* and in what *subject area* the answer should be found.

Answers to the questions are found and the source is shown to the librarian or the teacher. Clues and assistance are offered.

REPORT PROJECT

Details of the report assignment are discussed **Handout**

The *structure* of the magazine and newspaper databases on CD ROM and the search *strategies are explained.* **Overhead**

Form for bibliographic format and the cards for quotations from materials are explained. **Handout**

The information essay is explored.

Partners are selected by students and a topic of interest to them both is chosen.

Each student group is guided through the use of the **CD ROM** technology and computerized catalog.

Materials on a topic are gathered by students and are shared by free xeroxing. Materials are checked out overnight.

The **fourth day's** rain forest **announcement** is read over the school public address system.

LIBRARY PROGRAM DAY FOUR, FIVE, AND SIX
Freshmen *English* classes and their teachers.

Purposes for the lesson

Computerized catalog searches and CD ROM magazine and newspaper searches.

Materials in all formats on a selected topic.

Cards with correct bibliographic form and carefully chosen quotations of data or words.

A report on one topic about Brazil prepared according to written directions.

LESSON

Questions about the report are answered and a due date is set. Reports are handed into social studies teachers for a grade and then returned to students a few days later. Reports are rewritten following the comments of the social studies teachers before being turned into their science teachers. The reports are handed back to the students and revised for the final time before being passed into their English teachers. The criteria for grading the essays are set by each teacher and a written copy of the criteria is posted in the library.

Time to coordinate the work of partners in the same and in different classes will be given in social studies classes.

Access to computers during the project will be given first to freshmen.

The library will be opened extra time after school to allow freshmen to gather information, to work together, and to begin the habit of library use outside of class time.

The assignment sheet will be used by students to check off the requirements of the report and the report packets will be submitted to the social studies teachers.

The packets will be graded and the reports returned to the students for revision.

Student reaction to the library orientation project will be assessed through an evaluation sheet.

Teacher reaction to the library orientation project will be assessed through an evaluation sheet and a willingness to participate further.

World Rain Forest Week DAILY ANNOUNCEMENTS

WORLD RAIN FOREST WEEK DAY ONE

This week is World Rain Forest Week. A time to increase our understanding of the problems facing rain forests and their importance in our lives.

Rain forests make up 6% of the earth's surface but are home to 50% of the earth's living species.

Rain forests help to protect the earth from global warming.

The library is showing the video *The Rainforest* during periods 1-7 today. A rain forest has taken over the library. Visit this natural wonder before it vanishes.

WORLD RAIN FOREST WEEK DAY TWO

Half of America's song birds winter in tropical rain forests.

Thirty five percent of all American medicines came from tropical rain forest plants, trees, and animals.

1,400 varieties of tropical plants are thought to be potential cures for cancer.

Rain forests are part of our global heritage. Become better educated. Join us in the library to watch a video on *The Diversity of Life* periods 1-7 today.

WORLD RAIN FOREST DAY THREE

Many of the tropical rain forests are in developing countries with very large poor populations. To live these people clear the rain forests by slashing and burning an area. Within a few years the thin rain forest soil is unable to support crops or cattle and a new area must be slashed and burned.

Scientists from all over the world are trying to educate people to leave the rain forests intact. There is more value in sustaining the forest to collect nuts, fruits, plants, and latex than in farming or logging.

Today's video is *Our Threatened Heritage*. Show times are every period in the tropical rain forest.

WORLD RAIN FOREST DAY FOUR

Rain forests help to keep the earth at the correct temperature by taking the carbon dioxide in the atmosphere and turning it into oxygen. Carbon dioxide is released when coal or oil or wood or gas is burned.

Sunlight shines through this layer of carbon dioxide, but the heat from the sun can not escape back into the atmosphere through the carbon dioxide. The earth grows warmer. Rain forests protect the earth from global warming.

Visit the rain forest at the Franklin Park Zoo to learn more about these precious areas of the planet. Rain forests are the inheritance of everyone. Jacques Cousteau takes us on an Amazon River cruise to a thousand rivers in today's movie shown periods 1-7.

WORLD RAIN FOREST WEEK DAY FIVE

For 12,000 years the indigenous, the native, peoples of the Amazon kept the rain forest healthy. But..in the last 25 years, the Brazilian rain forests are disappearing at a rate of 50 acres per minute. Scientists are turning to the native Indian peoples, particularly the Indian medicine men, the shamans, to learn from their wisdom about plants, animals, and fish.

Chico Mendes, the slain head of the native Brazilian rubber tappers, said "We started fighting for the rubber tree and the Brazil nut tree and the good little life we had in the forest. And then we discovered that we were defending the whole of Amazonia. And now I have come to realize that what we are fighting for is all humanity."

Become aware. Save the rain forests. Support grass roots groups and environmental organizations. Our movie today *Spirits of the Rainforest* enters the ancient cultures of the Indians of the Amazon.

OVERHEADS

- Maps of Brazil
  - Political
  - Regional
  - States
  - Physical
  - Rain forests
  - Demographics
  - Environmental problems

- Diagrams of conceptual mapping

- Search screens of CD ROM
  - Magazines
  - Newspapers
  - Encyclopedias

- Analysis of elements of a question

Ideas for PICTURES

Rain forests
Biodiversity in plants, animals, fish, birds
Brazilian export products (ex. cashews with their fruit, Brazil nuts in their husk, coffee beans before processing)
Cities
Favelas
Ecosystems
Politic and social leaders
Medicines from rain forest plants
Indigenous tribes
Mines
Logging
Greenhouse effect
Factories
Cattle ranches
Rubber tapping
Amazon River
Carnaval
Candomble services
Umbanda services
Transcontinental highways
Foods
Festival costumes
Adolescent life
Churches

QUOTES For the Rain Forest

If you plan for one year, plant rice.
If you plan for ten, plant trees.
If you plan for one hundred years, educate
mankind.
Kuan-Tzu

By ethical conduct toward all creatures,
we enter into a spiritual relationship
with the universe.
Albert Schweitzer

Nothing is rich but the inexhaustible
wealth of nature. She shows us only
surfaces, but she is a million fathoms deep.
Ralph Waldo Emerson

Animals are not brethren, they are not
underlings. They are other nations,
caught with ourselves in the net of life
and time.
Henry Beston

Nature will bear the closest inspection.
She invites us to lay our eye level with
her smallest leaf, and take an insect view
of it plain.
Henry David Thoreau

Come forth into the light of things, let
Nature be your teacher.
William Wordsworth

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> Nature, in her blind thirst for life, has filled every possible cranny of the rotting earth with some sort of fantastic creature.
>
> Joseph Wood Krutch

> All this you will see, and much more, if you are prepared to see it,-if you look for it... We do not realize how far and widely, or how near and narrowly, we are to look. The greater part of the phenomena of nature are for this reason concealed to us all our lives.
>
> Henry David Thoreau

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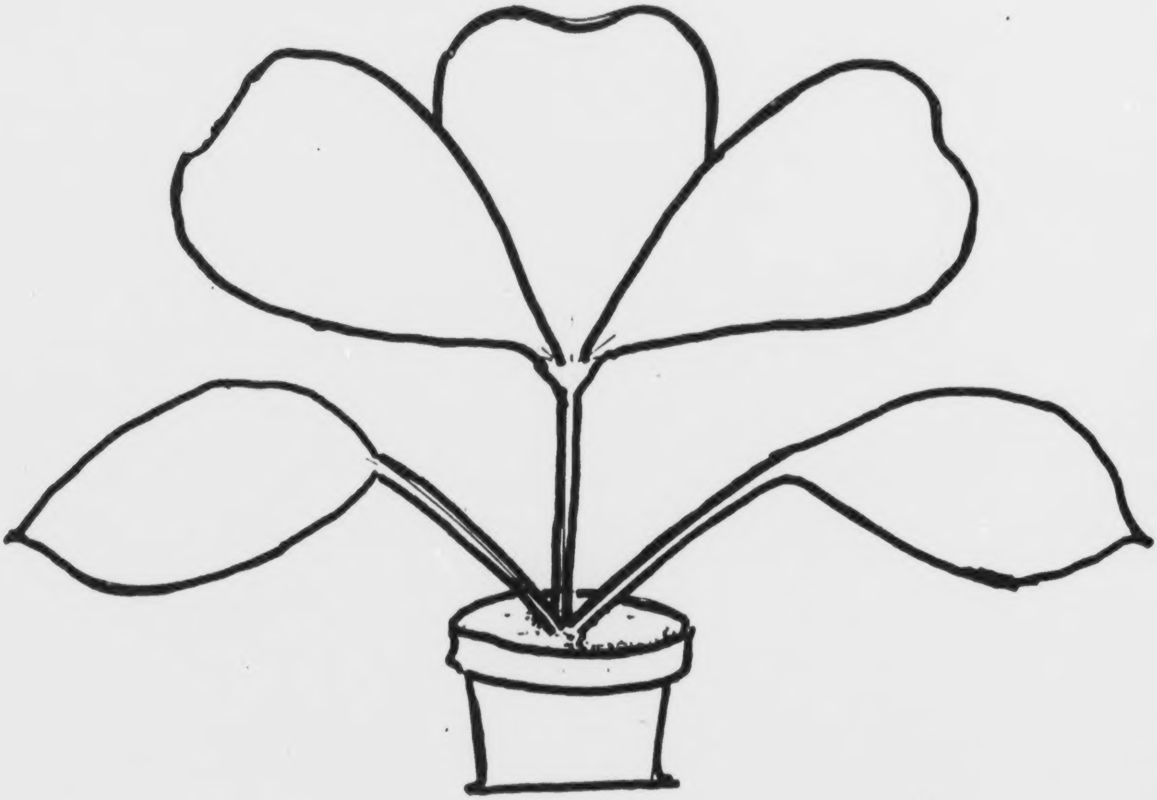

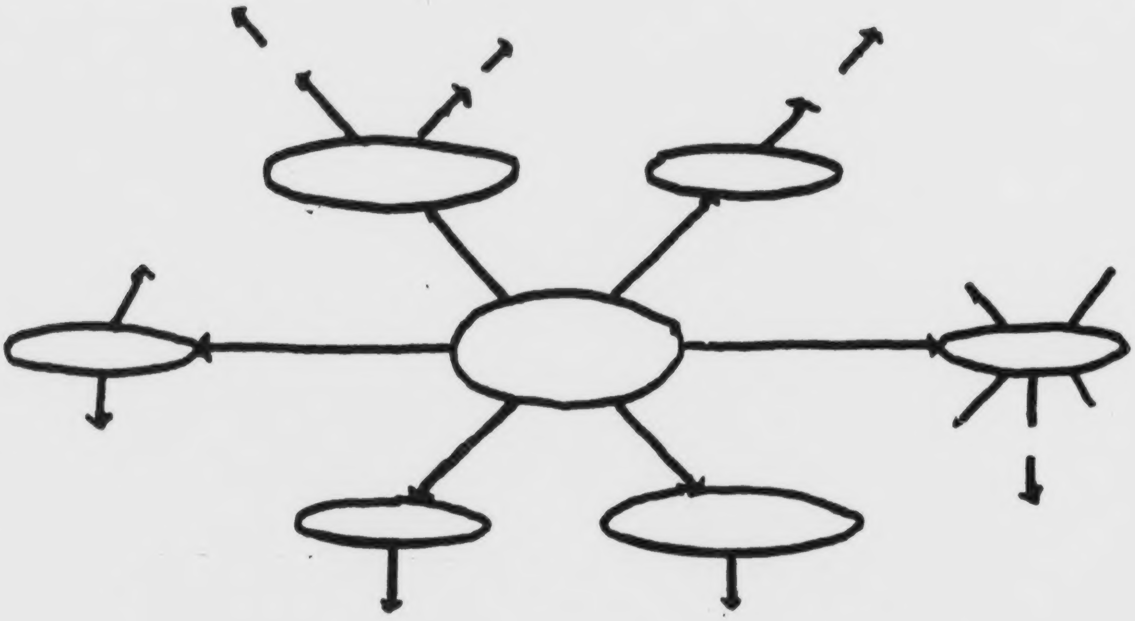

High School Freshmen
Library Orientation
ASSIGNMENT

World Rain Forest Week

General Topic: **Brazil and the Tropical Rain Forests**

Work in pairs to complete the following tasks:

Decide on a **report topic** on any of the topics covered during the orientation.

1. Using the **CD ROM magazine databases,** locate and print out one article on your topic. Include proper bibliographic information in your printout.

2. Using the **CD ROM newspaper databases**, locate and print out one article having to do with your topic. Include proper bibliographer information in your printout.

3. Locate **two non-fiction books** which could contain useful or interesting information about your topic. Fill out a note card for each with a relevant quote and proper bibliographic information.

4. (TO BE DONE *INDIVIDUALLY.*) Write an informational **essay of not more than 300 words** on what you have discovered on your topic through research of materials in all formats (Videos, slide shows, maps, overheads, reference books, books, picture books, pictures, audio tapes, CD ROMs, magazines, newspaper articles, and artifacts

Hand in all materials in a packet on__________ to your social studies teacher. The packet should contain:

___A title page with both of your names.
___The CD ROM magazine printout.
___The CD ROM newspaper printout.
___Two note cards.
___One essay for each partner.
___Any other material for extra credit.

Essays will be graded and returned to you between teachers so that you may **rewrite** the essay to incorporate teachers' suggestions.

HOW TO LOCATE A BOOK
THE DEWEY DECIMAL SYSTEM

Books are arranged on the shelves in numerical order according to the Dewey Decimal Classification system which divides all books among **ten** main divisions with numbers as follows:

000-099 **GENERAL WORKS:** including encyclopedias, newspapers, periodicals, bibliographies, etc.

100-199 **PHILOSOPHY:** including books on psychology, ethics, etc.

200-299 **RELIGION:** Christian and non-Christian beliefs including books on classical mythology.

300-399 **SOCIOLOGY:** including government, economics, education, banking, commerce, folk-lore, etc.

400-499 **LANGUAGE:** grammars, dictionaries, readers, etc. in all languages.

500-599..**SCIENCE:** including mathematics, astronomy, physics, geology, chemistry, biology, botany, zoology, etc.

600-699 **USEFUL ARTS:** medicine, engineering, business accounting, salesmanship, agriculture, etc.

700-799 **FINE ARTS:** including architecture, painting, photography, music, amusements, etc.

800-899 **LITERATURE:** poetry, dramas, debates, essays, etc in all languages.

NOVELS: are arranged alphabetically on the shelves by the author's surname.

900-999 **HISTORY, TRAVEL, AND BIOGRAPHY:** Books on HISTORY include all countries and all ages.

TRAVEL books for all countries have numbers between 910 and 919.

BIOGRAPHY: of an individual is arranged alphabetically by the name of the person written about.

COLLECTIVE BIOGRAPHY: covering the lives of more than one person arranged numerically under the number 920.

Search
QUESTIONS

What is meant by the term debt-for-nature swap?

Where did the Portuguese settlers live in Brazil in the 1600's?

Find a map locating the rain forest tribes in Brazil.

What is the original title of the Brazilian film *Black Orpheus?*

List some the customs of the indigenous rain forest tribes of Brazil.

Find a synopsis of one of Jorge Amado's stories.

Identify some of the tropical plants used as decoration in the library rain forest.

What is one of the major diseases caused by sewage polluted drinking water?

What kind of music is bossa nova?

How does the Brazilian voting system differ from ours?

Is a visa required when one travels to Brazil?

Find an address for the Brazilian-American Cultural Institute.

How did Brazil reduce its dependence on imported oil?

Find a Portuguese word that is the same as in English?

Find a picture of Pedro Alvares Cabral.

List some of the Afro-Brazilian cults.

Find a map showing the 26 states of Brazil.

Find a vegetation map of South America.

Find a picture of hydroelectric power in Brazil.

Who was the Brazilian politician Getulio Dornelles Vargas?

How does the burning of the rain forest lead to the melting of the polar caps?

Find how coffee beans are processed.

How many temperature zones are found in Brazil?

How many pounds of coffee berries can a worker pick in a day?

Where did Brazil get its name?

How many kinds of wood can you name from Brazil?

Who were some famous contemporaries of Brazilian musical composer Heitor Villa-Lobas?

Find a map locating mineral resources and fossil fuels in Brazil?

Find a synopsis of the movie *The Boys From Brazil.*

Find a map of population demographics for Brazil today.

Define ecosystem and find an illustration of one.

What are the latitude and the longitude of the Amazon region of Brazil?

Who was the predecessor of Brazilian President Figueiredo?

What countries are included in Latin America?

How is cocoa processed?

What is the most current inflation rate you can find for Brazil?

Find a trade routes map between Portugal and Brazil in the 16th century.

Who were some of the candidates running for president of Brazil in October's election?

Find a source listing major environmental problems of Brazil.

Tapioca is made from what plant's root?

What brought the Brazilian rubber boom to an end at the turn of the century?

List the products that were part of the boom-and-bust Brazilian economic history.

Describe some of the beliefs of the Indian shamans of Brazil.

What are some famous dishes of Brazilian cuisine?

Find the names of famous Brazilian writers of this century.

What are the waterfalls called in the movie *The Missionaries?*

What culture(s) produced the famous Brazilian samba?

Who was the famous Brazilian singer who went on to become a Hollywood star earlier in this century?

Who composed the song *The Girl From Ipanema?*

How many times has Brazil won the World Cup in soccer?

What are some of the African gods that are identified with Catholic saints in the Candomble religion?

What are some of the religious differences between Candomble and Umbanda?

How do you say hello and good bye in Portuguese?

How does the population of the city of Sao Paulo compare with New York City?

If Sao Paulo grows at 500,000 people per year, what US cities does this figure of 500,000 compare to?

What United States medicines originated as tropical rain forest plants?

Define using a biology dictionary the term endemic species.

Where are there some extractive reserves in Brazil?

What are some of the names of conservation groups working in the Amazon?

What is meant by a biosphere reserve?

Describe what is meant by the greenhouse effect.

How does the cutting down of the rain forest affect the climate of the world?

Why did American fast-food restaurants stop importing beef from the tropical rain forests of Brazil?

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ORGANIZATIONS Interested In Preserving Rain Forests

Conservation International
1015 18th Street, NW
Suite 1000
Washington, DC 20036.

Cultural Survival, Inc.
53 A Church St.
Cambridge, MA 02138.
(Interested in rights of
indigenous peoples
Good materials available)

Earthwatch Belsyre Court
57 Woodstock Rd
Oxford OX 6HU
(Paying volunteers work with
scientists in rain forest)

Environmental Defense Fund
257 Park Avenue South
New York, NY 10010.

Environmental Policy Institute
218 D Street, SE
Washington, DC 20036.

Friends of the Earth
International
530 Seventh St., SE
Washington, DC 20003.
(Pressure group
Good information)

Friends of the Earth
Funatura
Fundacao Pro Natureza
02-0186
7001 Brasilia.

Global Tomorrow Coalition
1325 G Street, NW
Suite 915
Washington, DC 20036.

Greenpeace
1436 U St., NW
Washington, DC 20009.

Inter-American Development Bank
1300 New York Avenue, NW
Washington, DC 20005.

International Society for the Preservation
of the Tropical Rainforest
3931 Camino de la Cumbre
Sherman Oaks, CA 91423.

The Living Earth Foundation
10 Upper Grosvenor St.
London WIX 9PA.

National Audubon Society
700 Broadway
New York, NY 10010.

National Resources Defense Council
1350 New York Avenue, NW
Washington, DC 20005.

The Nature Conservancy
1815 North Lynn St.
Arlington, VA 2229.

The Nature Conservancy
International Program
1785 Massachusetts Ave., NW
Washington, DC 20036.

Rainforest Action Network
301 Broadway, Suite A
San Francisco, CA 94133.
(Good lists of materials)

Rainforest Alliance
270 Lafayette Street
New York, NY 10012.

Survival International
310 Edgware Rd.
London, W21DY.
(Rights of indigenous peoples)

Tropical Ecosystem Research
and Rescue Alliance
Terra International
Washington, DC 20036.

US Agency for International Development
320 21st Street, NW
Washington, DC 20532.

World Wide Fund for Nature
(Formerly World Wildlife Fund)
1601 Connecticut Ave, NW
Washington, DC 20009.
(Largest conservation group in world
Manages rain forest reserves
Produces accurate surveys)

The World Bank
1818 H Street, NW.
Washington, DC 20433.
(Ask WB to fund only projects
not environmentally harmful)

World Wildlife Fund/Conservation
Foundation
1250 24th Street, NW
Washington, DC 20037

EVALUATION FORM

Freshmen Orientation
Brazil and the Rain Forests

Rate your answers on a scale of 10 (most agreed) to one (least agreed)

Did the orientation teach you how to use the high school library?_____.

Are you able to use the CD ROM magazine and newspaper databases?_____.

Did you find it helpful using the library with more than one teacher?_____.

Did you find it confusing using the library with more than one teacher?_____.

Did you find it helpful working in pairs?_____.

Would you rather have worked alone?_____.

Will you use audio visual equipment when you give a class presentation?_____.

Will you use formats other than books and magazines to learn from in the future?_____.

Did you learn much about Brazil and about its rain forests?_____.

EVALUATION FORM

Freshmen Orientation
Brazil and the Rain Forests

Rate answers on a scale of 10 (most) to one (least).

Did your students use your class time (one to three periods) profitably in the library?_____.

Were you satisfied with the relationship of Brazil and its rain forests to your curriculum?_____.

Do you feel that this collaborative method of freshmen orientation should be repeated?_____.

Next year would you rather freshmen orientation be just in English classes_____ or just in social studies classes_____or just in science classes? _____.

Was the collaborative planning time sufficient?_____.

What would you change? The collaboration_____. The subject focus_____ The time frame______. The report______. Your part_____.

Other ideas to add:

The next phase of library skills includes online databases, e-mail, other library databases, resources available through the internet. Are you interested in your classes participating?_____. Would you like to select the topic and outcome?______ or a collaborative topic?.______.

BRASIL

A report by:

Brian Fitzpatrick

Fulbright July '94

The purpose of this document is to elevate the social consciousness of junior high and high school students at Jefferson County Open School. It will also be placed in the district wide curriculum and avaialable to the other schools within the Jefferson County School District. I will also be available to present Brazilian classes outside of my school. My first hand experience throughout Brazil will vitiate the presentations and hopefully sensitize some adolescents to the economic plight of the third world, and in this case Brazil. Perhaps they will be exposed for the first time to the expression " Live simply so that others may simply live."

Rationale
Why Study Brazil?

Brazil is the giant of neighboring Latin America. It is the fifth most populace nation on earth and one of the largest countries in the world. It has abundant materal resources and the Amazonian rain forest with it's incomparable planetary gene pool.

Brazil is also a representation of the enormous challenge confronting the third world. Some of these challenges are resource exploitation, income distribution and crime, urban migration and favela growth.

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inflation , illiteracy, population growth and many others.

But perhaps the best reason to learn about Brasil is that it has the potential to overcome its problems. Brasil is the land of spirit,the resilience and exuberance of its people is legendary and deserved.

It is a new world nation with a new breed of people. They have come from Asia,Africa and Europe and they are entering the third millenium with enormous human and natural gifts and formidable challenges.

The Brazilian saga is still being written and can still be guided. That's why it should be studied, even if one dosen't have an interest in samba, candomble, capoeira, sertao, Serra Pelada, terra roxa, Iguacu, Curitiba, quilombos, Solimoes, mamelucos, mata atlantica, Pernambuco, pagodes, carnaval, pau brasil, bandierantes, Itapu, jeitos, cachaca, feijoada, Paulo Freire, Portuguese, cerrado, slavery, the rubber boom, cafuso, caiprinhas, cariocas, Pelorinho, berimbau, baianas, Dona Flor, biology, sustainable development, indigeneous people, miscegenation, the legalization of drugs, Olodum, futebol, the pedagogy of the oppressed, orishas, social justice, military rule, favelas and so much more.

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The Future and it's Challenge

Whether you are a communist,capitalist, socialist,barterist,hippie, monk , punk or whatever, you cannot escape the economic paradign It is all encompassing At the moment comunism appears to be a fading idealogy while capitalism grabs the spotlight However

'the wheel is still in spin and there's no telling who that's its namin cause the loser now will be later to win for the times they are a changin"

Brasil is an absolutely incredible economic story I have in my hand a 500,000 cruzeiro bill wich is worth about 18 U.S cents It is difficult to believe that the fifth most popular nation on earth can function with such hyperinflation

The inequitable distribution of wealth is nothing short of criminal The upper 10% of Brasilian society accounts fo 47.5% of total national income The bottom half of the society accounts for 12%, less than the 14.5% of the national income earned by the top one percent

In a nation that prides itself on being the tenth largest economy in the world only one and one half percent of wage earners receive annual income in excess of $ 17,000 Two percednt earn between $8,500 and $17,000 a year, 30 percent bring home between $2,000 and $8,500 yearly, while 52 percent earn less than $2,000 each year Another 12 percent exist in the sub-world of the under employed, earning loose change washing cars, selling sundry items on Brasil's street corners or simply begging

A knowledgeoble debater could certainly make the case that enviromental impact is a function of 1 Population numbers and 2 The wealth of the population Ergo first world nations are the principal ecological culprits However all people want the gluttonous consumption of the wealthy countries and Brasil is no exception the stage is set, Brasil's pristine environs are lying there ready to be ravaged by a poverty stricken population and a throng of international corporations If the global community doesn't design implement and maintain a sustainable development model the 21st century will be one of misery and havoc The solution to the problems are known Illiteracy needs to be countered by education, urban migration by job decentralization , rural development and other incentives. Population needs to be checked by family planning, corruption by stiff penalties for white collar crime and citizen review panels And finally poverty must be cured in the context of sustainable development However,these solutions are cloaked in the beffudling web of political action and organization Paulo Friere's Pedagogy of the oppressed is a visionary educational model which speaks eloquently to the third world dilemma. Within it he constructs the route the poverty stricken must take to liberate themselves. The political action and organization he designs is a confrontational axiom to the culture of silence. It is Brazilian and perhaps one of the most revolutionary books of our age and therefore gives me nore hope than anything else I witnessed in Brasil. And for that reason I would like to digress into the Pedagogy of the oppressed to look for the solution to the multifarious problems of Brasil.

Years before Paulo Freire was "invited" by the Brazilian government to leave his homeland after the military coup of 1964, he had begun devoting his life to the advancements of the fortunes of the impoverished people of Brasil. After his exile he moved first to Chile, then emigrated to the United States. In the course of his work and travels in the Third World and as a result of his studies in the philosophy of education, he evolved a theory for the education of illiterates, especially adults, based on the conviction of every human being, no matter how "ignorant" or submerged in the "culture of silence," is capable of looking critically at his world in a dialogical encounter with others, and that provided with proper tools for such an encounter he can gradually perceive his personal and and social reality and deal critically with it. When an illiterate peasant participates

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in a sort of educational experience he comes to a new awareness of self, a new sense of dignity; he is stirred by new hope. "I now realize I am a man, an educated man." "We were blind now our eyes have been opened." Before this, words meant nothing to me, now they speak to me and I can make them speak. "I work, and working I transform the world."

As the illiterate learns and is able to make such statements, his world becomes radically transformed and he is no longer willing to be a mere object responding to changes occuring around him. He is more likely to decide to take upon himself, with his fellow men, the struggle to change the structures of society that until now have served to oppress him. The self-awareness, however, is not only the task of workers in the Third World but of persons in this country as well, including those who in our advanced technological society have been or are being programed into conformity and thus are essentially part of the"culture of silence"

Latin America has waited for change froom above for five hundred years; it has not come. The cycle of poverty and misery must be shattered from below. The dispossessed must reject the "banking theory of education" and via praxis [simultaneous action and reflection] confront their oppressors. We Fulbrighters saw glimpses of it in Rocinha amidst its urbanscape of squalor. I heard the incipient stages of it with a university professsor so concerned with crime that he was ready to abandon the oppressors meager bribes and unite with the illiterate masses' colossal shout for human justice. "No man is an island" rings even more true in crime ridden Brasil. The elite are impoverished by fear and moral lassitude while poor children are relegated to hopelesss lives of prostitution and crime. Brasil offers us mankind's greates challenge and Paulo Freire provides a road map. Any rational pundit would offer us a dismal scenario of hope. Freire's positive pedagogy empowers those without hope to create their own and to make the struggle their children's sustenance. It is a pedagogy of courage and involement which are the very heart and soul of life. Will Brasil succumb to its historical syndrome or can it couple its beneficient geography, spirited population and Freire's pedagogy to forge a sustainable habitat for future generations?

Geography

Brasil is the fifth largest and fifth most populace country in the world. Brasil is larger than the 48 contiguous states of th USA. It covers about half of South America and borders on all but two of the continents other countries. Two prominent features dominate the terrain, the Amazon River and the Central highlands, a plateau which rises southward from the planet's most voluminous river. Three other topographical zones cover the rest of the country, the Pantanal, the Coastal plain and the Guiana Highlands. Most of these features are tropical and therefore a biological wonderland. Overlain on this magnificent geography is a complex racial and cultural tapestry. Amero Indians provide a legacy of ecological sensitivity. Africa offers its joi de vivre and creativity . Europeans of Portuguese, Italian and German descent as well as a significant Japanese population give Brasil its entreprenurial heritage. It is not my purpose here to provide a protracted geographic description please see the bibliography to sate your particular interest.

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History

The history of Brasil is long and complex and this summary is simply a gesture to provide a quick background for the cursory interest of a casual high school student. Please see the Bibliograpghy for in depth studies.

Brasil was claimed for Portugal by Pedro Alvars Cabral in 1500 and remained a monarchy into the 19th century. Before that it was a vast sparsely populated domain of American Indians. It gained its independence from Portugal in 1822 without violence and was spared the wrenching civil wars of other Latin American colonies.

Sugar was Brasil's first razon de'tre its sweetness fostered the bitter slave trade which gives Brasis it exuberant African heritage. Later rubber, coffee, and gold were the mainstays of economic activity. From 1840 to 1889 Don Pedro 11 of Portugal was emperor during Brasil's golden age. It was the abolition of slavery which finally brought the empire to an end. Abolition alienated the planters from the empire and ensured that the empire would have no defenders when the time came for its own abolition.

The end of the monarchy marked the arrival of what was to become Brasil's most powerful institution- the armed forces. Without exception, from 1889 to the present day, the military has been at the center of every important political development in Brasil. Alternating good and bad presidents,Brasil went through a period of dramatic social change beween 1900 and 1930. Large numbers of immigrants from Europe, mostly Italians settled Sao Paulo. The rapid ascension of Getulio Vargas signalled the beginning of a new era in Brasilian politics. He shifted power from the landed gentry to the urban classes by enacting a minimum wage, a social security system, paid vacations and maternity leave.

After Vargas' suicide in 1954 Brasil entered a period of spectacular economic growth which ended abruptly on March 31, 1964 when the military staged a bloodless coup. They remained in power for 21 years and violently destroyed all left wing opposition. With the advent of the 1980's however, the military regime fell on hard times. Economic growth first slowed then slumped and the debt crisis exploded. Finally in 1985 civilian rule returned. Since then hyper inflation has plagued the economy. A five hundred thousand cruzeiro note is worth about eighteen American cents. And so when our Fulbright group arrived in July of 1994 we were met with a new monetary plan. Many think it is only a ruse to propel the ruling elite back ints power in the October elections.

The future of Brazil is written in its past and the challenges are enormous. Can the government redistrinute wealth to assuage the oppressive squalor of the masses or will wealth continue to be funneled into select pockets? If the historic trend continues Brasilian society will be threatened with chaos.

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12

Another Memory

The grip was sudden and strong. My neck was in a vise. My first thought was "what's going on?" A micro second later I realized we were being attacked, though I had no idea by whom or how many. I immediately dropped my elbows to protect my side from the expected stab, it didn't come. Then I heard "dinero" barked from some unknown voice, I was unable to respond as I watched bystanders staring at me. Another thought raced through my mind, take this guy into the river ten feet below and equalize the game. But just as quickly as the idea surfaced, I rejected it, "not yet" I thought, "it's too drastic", too soon. If the river is shallow I'll break my neck. So I began to kick and throw elbows, though this response I'm sure had nothing to do with their flight, which was as fast as the assault. All I saw was three men disappear into the market crowd. I

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chased them for twenty feet and realized I was not going to catch fleet footed young men Staring at the crowd my thoughts turned to my companion

She was visibly distraught She had seen the incident, I had felt it Apparently there were five young men, one with a broken bottle which was used to menace her They fled with everything she had in her arms two packages of tee shirts, a camera case, and her purse Unknowingly I looked down and saw the camera still clutched in my hand I felt my shirt pocket and my cash was still there Before leaving the hotel I realized Belem was a tough port town so I casually mug proofed myself Everything that was taken was from Rachel, including her composure.

An animated mullata stepped from the crowd and began jabbering in Portuguese, I responded in Spanish and some very broken Portuguese, no one spoke English Two policemen appeared and we walked with them to a small hut two hundred yards from the scene where two men were cowering from the ubiquitous police officers The shirtless men had fear in their eyes and I had a sharp pain in my neck as a result of the assault I was asked if I could identify our assailants, I said I could not, I had seen only three men fleeing, one was wearing a red and white baseball cap But there at their feet was the evidence the camera case, the purse, minus

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$60 in cash and the tee shurts which read "Economic inequalities kill more than war" and "Youth has the duty to struggle for social transformation". The policeman banged his black boot on the toes of the cowerng suspect who blinked and flinched and whose eyes revealed what was to come Police brutality is infamous in Brasil I squirmed from the thought of violence Opposing thoughts filled my consciousness My intellect wanted to buy my assailant food and clothes and my neck, which had been recovering from a ruptured disc for a year, told me to punch this guy in the face Thankfully the intellect won out, but as I write this two months later the enduring pain in my spine reminds me of the constant pain of poverty which is endemic throughout Brasil.

The assault became a physical affirmation of the sterile , incessant, intellectual conversations our Fulbright group indulged in daily My neck pain became the point of the needle which injected the pathos of poverty into me, I was no longer a well fed , well bathed, aloof observant, I too suffered, and am a victim, the pain is close and everpresent, I now too feel the hammer of oppression, the systemic violence which drives men to desperate acts I believe the assailants did not want to hurt me, they were only interested in material things, but the flagrant desperation shocked me Police were ubiquitous in the Ver O Peso market and the assailants immediate capture emphasized the futility of their acts. My mind went back to our intellectual economic bantering while my neck spoke volumes about poverty and injustice. I know that the joyous memories of Brasil will last longer than physical suffering. Brasil incessantly showed me that it is a land which grows people of spirit, smiles and joy blot out squalor and African rythms are the cadence of the cracked streets.

I shall never forget the all girl drum corp which pounded their personal thunder through narrow streets of Pelorinho. They drove that thunder deep into my chest til I felt the frenzy of Carnaval and the immense human energy released during that pre Lenten Bacchanal. The power and rythm beat itself into my timid Caucasian psyche and I envied that black throbbing pulse.

Yes, Brasil is full of lessons, it is full of injustice and environmental plundering, but it is even more full of a people who sustain hope against all odds and live with a generosity of spirit which can unabashedly laugh at the orderly, short term exploitation which we call progress. And, after all, life viewed from the other side of death is not measured in dollars and possessions, it merely dissolves and distills itself into pure spirit. Perhaps we have much to learn from Brasil.

Howard M. Fraser
Department of Modern
Languages and Literatures
College of William and Mary
Williamsburg, VA 23187-8795

The Photography of Workers in Brazil

Photography has the power to indelibly record aspects of everyday life and to instantly convey experiences from one culture to another. So it is with the photographs of the Brazilian Sebastião Salgado, who was twice acclaimed the world's premier photographer by the International Center of Photography in New York. Salgado's most compelling images are of simple, hardworking people who persevere in their daily struggle to survive. His photographs have appeared in newspapers and magazines around the world and depict such dramatic scenes as workers in Kuwait, metallically gleaming, soaked with sweat and the oil from the wells they have capped, and dogged survivors of famine on the plains of Rwanda. He has characterized his own brand of photography as a militant art form which seeks a better understanding of humanity and a precise assessment of human labor.

His most recent project is a volume of photographs of laborers from around the world entitled Workers. This publication is extraordinary as much for the inherent power of Salgado's images as for the breadth of his vision. What makes Workers particularly important is its international focus upon laborers including three Brazilian sites: the sugar-cane fields in the state of São Paulo; cocoa harvesters in Bahia; and gold miners from the Serra Pelada in the state of Pará. In these as well as his other images, Salgado highlights workers' will to survive and to perform at the peak of their capacities.

Salgado subtitles the book "An Archaeology of the Industrial Age" to prophesy the extinction of physical toil that is depicted in images throughout the volume. In view of this archaeological perspective, the book's epigraph is most appropriate: "This book is an homage to workers, a farewell to a world of manual labor that is slowly disappearing and a tribute to those men and women who still work as they have for centuries."

In an interview broadcast on National Public Radio last year, Salgado spoke of this visual memorial to traditional forms of labor in a way that underscored the educational value of his photographs. According to Salgado, his pictures form a cultural bridge from third-world workers to first-world viewers as they illuminate manual labor as an artifact of a culture which is fast becoming marginalized by modernization and automation.

> I believe that probably we are living in a new Industrial Revolution. In traditional means of production and labor, men came together to produce some goods for our consumption. This kind of work is more or less disappearing around the world. For me, these pictures are a kind of homage to this class that produced for us for hundreds of years is now something has changed, something is going.

In this same interview, he admonished his audience lest it sense that the millennium was at hand and that manual labor had at last become a more gentle and humane enterprise. While Salgado concedes that traditional methods of manual production are declining around the world, the modern beneficiaries of the toil of downtrodden laborers inhabit a sanitized utopian world, a sterilized fool's paradise which is itself isolated from the reality of the hard, physical work and large-scale production which have guaranteed the survival of the modern world. Those whose existence is isolated from these workers do not sense the epic quality of their toil, and Salgado's mission is to venerate these anonymous modern-day heroes as he concludes in his interview:

> We must remember, living in towns, working with computers, in clean rooms, we imagine that all work is like this. But I tell you that after six years in my travels around the world in more than forty places of work I can tell to you that the majority of workers around the world work very hard, and their production is very hard. Sometimes when you go in a supermarket you have the impression that the goods that you try to consume were made as they are displayed in the supermarket. But we do not know where they come from. And so I can tell you after all this traveling where they do come from and how hard and how difficult it is to produce them, and how proud are the people who produce them, too. I begin to see how the workers are a kind of line that link humanity.

How photographs connect human beings across the distances which separate them, how photographs speak to Brazilians, and how Brazilians respond to photographic images of workers is the principal subject of this essay, the product of an study I undertook on the Fulbright-Hays Summer Seminar. While in Brazil, it seemed particularly appropriate for me to use Salgado's photographs as a point of departure for discussions with Brazilians from several walks of life and age groups concerning a variety of ecological and social issues. As a complement to Salgado's pictures, I also used images of urban domestic workers in Brazil taken by an American photographer, Pamela Duffy. The combination of the works of these two photographers formed an portfolio of rural and urban laborers which served as a comprehensive photographic overview of workers in Brazil.

The interview subjects utilized their viewing photographs of workers as a stimulus to freely comment on directions Brazil was taking at a significant moment in its development. Their concern for their homeland surfaced amidst three pivotal events taking place in Brazil in 1994, a year marked by popular exuberance and political and economic challenges reflected in the World's Cup in Soccer, general elections including the selection of a new President, and one of the most ambitious overhauls of the monetary system in Brazil's history.

The interviewees, approximately the same number of males and females, included a building contractor, teachers of English, a senior diplomat, a laundry attendant, high school students, a dress designer, and a tour guide. The tape-recorded interviews, conducted in Portuguese, featured the following questions:

1. Headlines published in the Brazilian newsmagazine Veja contain the following remarks regarding the future of Brazil: "There is room for optimism." "We are coming out of the bottom of a well." "Brazilians, by cultural tradition, are a people of adaptations, who basically are not inconvenienced by anything, whether hot or cold. Brazilians are always happy and full of hope." Do you share this optimism and hope?

2. In the United States, we are beginning to pay more attention to Brazilian politics. How do you think the presidential election will turn out this year?

3. In the Brazilian press there appear references to an "ecological invasion of environmental groups who have raised capital abroad in order to buy land in areas which they would like to preserve." What is your reaction to this world-wide interest in Brazil's ecology?

4. What is your response to Jô Soares's humorous piece in Veja that opens as follows: "So many Brazilians are moving away from Brazil that the government should keep track of **Exports of Brazilians**." According to current statistics, 130,000 Brazilians leave their homeland each year (moving to the United States, Japan, Italy, Portu-

gal, England, France, etc.).

5. Why do you think that Ayrton Senna's tragic death affected the entire country as deeply as it did? What do you think of the headline, "Ayrton Senna, idol of our generation?

6. Please comment on the following photographs of workers by Sebastião Salgado and Pamela Duffy.

The people I interviewed were remarkably consistent in their sensitivity to social and ecological concerns and in their articulation of themes touching upon these issues which are reflected in the photographs of both Sebastião Salgado and Pamela Duffy. For this reason, I have consolidated their remarks into the following summary of our discussions.

1. Optimism

Brazilians address the challenges which the future holds for them in two ways which may seem contradictory: optimism and resignation. Their resignation is a product of longstanding disappointment due to their country's considerable potential which has not been fully realized. Much discontent derives from a difficult economic situation which has forced many Brazilians to work for a minimum wage. There is also trepidation with the creation of each new economic plan, because numerous other plans have been inaugurated and have failed. This feeling of malaise is present in the lyrics of carnival music [e.g.; Tristeza não tem fim, felicidade sim (tr. Sadness has no end, but happiness does)] from the Brazilian film, *Black Orpheus*.

Nonetheless, Brazilians are eternally optimistic as they seek a way out [**saída**] of their extremely difficult economic and social problems. In addition to placing great faith in their elected representatives for solutions to their difficulties, this year they have linked their hopes for the future to a Brazilian victory in the World's Cup with an almost fanatical energy. Brazilians' expectation of winning their fourth world title [**o tetra**] alleviates the burden of economic, political, and social hard times. The entire country has been united due to its confidence of victory. This kind of unity happens only rarely in Brazilian life, such as during the Christmas celebrations during **Carnaval**. It is a testimonial to Brazilians' optomism that ther exist parallels between the mummery of Carnaval and the euphoria of this year's World's Cup. Both provide an opportunity for solidarity as Brazilians are *one*. DFuring this World's Cup, there is a feeling throughout the country akin to Carnaval when Brazilians can mask their fears and foreboding about the future beneath costumes, parades, music and dances.

Beyond the escapism inherent in Carnaval and sports, one of the most positive and encouraging developments in the country during the past years has been a heightened awareness of what it means to be a Brazilian. A growing sense of citizenship is taking place in the country thanks to the formation of base communities which nurture grass-roots politics. Brazilians hasten to declare that Brazil is a bountiful country, a country with great wealth and great potential, but a land which is poorly managed. The masses are not automatically following the paths set for them by the elites, which is evidence of a more critical view by Brazilians of their past reliance upon government. In view of this attitude and the generalized dissatisfaction with the existing government, particularly since the failure of Fernando Collor de Mello's presidency, Brazilians expect a significant participation in the upcoming elections.

2. Politics

This year's electoral campaign bears a striking resemblance to previous races. The same candidates compete, particularly the familiar politicians Fernando Henrique Cardoso and Lula da Silva. In recent history, unfortunately, the party whose candidate wins the election does not easily command an absolute majority, and so it cannot possess great power. One of the principal topics in this year's election is the "plano real," the new economic plan engineered by Cardoso. The timing of the inauguration of the new currency is central to his political fortunes as well as those of the country, because if the currency can be stabilized and inflation controlled, his election will be assured.

Considering Brazil's experience with democracy in the past few years, there is considerable skepticism regarding the effectiveness of politicians and of politics in general. As a result, this year's electoral campaign has produced considerable trepidation, principally due to the corruption that has prevailed in politics. Given this atmosphere of disaffection, there is a danger that many potential voters will not vote at all, or that they will cast improper ballots, i.e., leave their ballots blank, thus nullifying their vote. Dissatisfaction may also take the form of removing incumbents and sending a new congress to Brasília. Many may vote but

3. Ecology

Brazil is a developing country of great natural beauty, and so my the first issue concerning the presence of outside groups is do they intend to preserve the ecology or to exploit it? Of course, if their goal is preservation of the ecology and to help Brazil, then their aid should be welcome in the country.When the goal is truly preservation, then it is justified for these groups to invest in Brazil. But what frequently occurs is a masquerade of preservation, that is private exploitation of the products of the land such as extraction of lumber or minerals, which has a negative force on the ecology.

Regarding the life of workers in ecotourism, for example. Many laborers would rather be employed in tourism than in agriculture or raising cattle. In a sense, the tourist industry has more dignity associated with it and represents a better livelihood for them.

As a sign that the ecological outlook for a more responsible land management is occurring, there are more protected forests, and the number of tracts of land capriciously cleared and burned off are declining. This may be due to the realization that soils of the rain forests are poor in nutrients and will not readily support agriculture. Therefore, exploitation of the Amazon, for example should be conducted in a more rational way and should be sensitive both the potential income it holds as well as the as yet uncatalogued resources which are of substantial value to the entire planet. In this effort, the involvement of foreign organizations should be welcome.

4. "Export" of Brazilians

Soares is a great humorist who satirizes everything in Brazil. But when you think about the content of the piece, it is somewhat misleading. Brazilians who leave the country expect to emigrate to a place where they will earn a better livelihood. But this doesn't always happen. One factor working against greater prosperity for Brazilians leaving the country is that in the US, there is a great need for unskilled labor. These transplanted Brazilians frequently take unskilled jobs as waiters, etc., for minimum wage. And so, even though the US minimum wage is higher than the Brazilian, nonetheless, the cost of living is higher, too. Everything is more expensive than in Brazil. Consequently, many Brazilians who have moved to the US encounter difficulties in immigration, and many suffer more than if they had remained here.

Recognizing the problems transplanted Brazilians experience in the United States, then presidential candidate Fernando Henrique Cardoso, wrote in the September 1994 edition of The Brasilians an article entitled "O fim da diáspora" [The End of the Diaspora]. Cardoso compares his own departure from Brazil as a political exile two decades ago to the relocation of thousands of Brazilians who sought respite from poverty and unemployment in the past few years. As he beckons for political exiles and those fleeing the depressed economy to return home, he offers hope that his placing a high priority upon agriculture will provide thousands of new jobs, the plano real will break the back of inflation, education will improve, and the rule of law will prevail in the streets as well as in the government.

5. Ayrton Senna

Sports figures have captured the imagination of Brazil and have become idolized in a country without heroes. Even if "Tiradentes" [Joaquim José da Silva Xavier (1746-1792), the eighteenth-century patriot and forerunner of Brazilian Independence] is considered a Brazilian hero, it is not always in the most positive terms. He was the only protagonist of the "Inconfidência Mineira" [the conspiracy in Minas Gerais against the Crown] to be executed, and while that tragedy is commemorated with monuments to Tiradentes and high-flown rhetoric, he is not idolized by many Brazilians.

To fill the vacuum left by the dearth of heroes, all nationally known sports figures in Brazil tend to be idolized. Ayrton Senna was a world-class Formula 1 driver who was killed in a racing accident in Italy in 1994. He was generally recognized and even venerated as a wonderful young man of good character, someone who, unlike some other Brazilian sports figures, always spoke well of his country, which endeared him to all Brazilians.

As in the case of other mega-stars in sports like Pelé, Senna had an almost mythical hold on the people. Auto racing here is a sport that attracts many Brazilians, like football does in the US. Thanks to his outstanding charisma, then, the press was able to magnify his popularity to mythical proportions and also exaggerate the genuine sentiment and grief the people felt for an entire week after his death.

One factor which contributed to his heroic status was television. Instantly known across the nation, Senna nevertheless always seemed somewhat unreal, due to the mythic quality of his celebrity status. He assumed a god-like rank, someone magical and grand. For this reason, Senna's spectacular funeral and the national outpouring of grief was something of a surprise to many Brazilians. Few realized the deep effect he had on his country until the time came to memorialize him. It was then that it became evident how Senna had touched people from all segments of Brazilian society to such an extraordinary extent — children identified with him and wept, and adults suffered from depression upon his death.

6. Photographs of Workers

In keeping with the theme of workers in the following photographs, some observations on the labor of photographers should be in order, particularly with respect to this project about Brazilian workers. Photographers frequently appear to be observers or voyeurs who maintain a distance from their subjects in order to preserve their objectivity and anonymity. Before studying the images of Sebastião Salgado, it should be noted that by obtaining permission to observe laborers while they work and to earn their trust are major accomplishments, the photographer moves in close to his subjects and ceases to be the objective bystander. In the light of the ecological sensitivity of the Brazilian sites he has selected for Workers and the potential dangers to which he is constantly exposed, Salgado's ability to find these areas, to gain access to them, and to establish an atmosphere of trust with his subjects is particularly important. In his NPR interview, he speaks about the process he employs in order to establish rapport as a necessary prerequisite to taking a picture:

> In the gold mine I spent at least three or four days putting myself inside the ambience, in order to be accepted by the people, to be integrated, and to discuss their work with them. It was also necessary to spend some time to learn, too, what is going on and for the people to learn a little bit about you, get to know you four or five weeks to do the shooting.

Sugar Cane: boias frias

Photo #1 Boias frias *(photo on next page)*

In the United States, itinerant, migrant workers supply a much-needed work force in agriculture. In Brazil, a curious situation has arisen with regard to the production and harvesting of sugar cane used in the production of alcohol. Since the early 1980s, under the military government, a subtle deception has been perpetrated upon the Brazilian people in order to create jobs in the sugar industry. Gasoline, which has always been abundant in the country, is exported and alcohol derived from the sugar cane remains in the country to supplement the supply of gasoline and diesel fuel for automobiles and industrial uses.

Of course, reliance upon alcohol has the salutary effect of improving air quality. In order to satisfy this demand, large numbers of workers recruited to work in the fields board buses early

each morning at around 4 AM, ride to the fields and return late the same night. Ironically, while the fruits of their labor marks a step forward for progress, they have to work under extremely primitive, even sub-human conditions. They rarely have the benefit of medical care or insurance against disease or personal injury.

As an important innovation in recent years has been the inclusion of women in the paid work force. It should, nonetheless be noted that women have been present in the fields, but not as paid workers until recently.

Cane harvesters are among the most severely exploited in Brazil. They are paid very little and can be considered to be living in a kind of slavery. The laborers In these pictures, you can see the that the working conditions are not the best. The workers are subjected to harsh working conditions,. Therefore they need special protection, i.e. gloves, pants, etc.

Photo #2 **Contrasting technologies in sugar cultivation**
(photo on next page)

A curious commingling of times exists in Brazil with the result that, as this picture shoes, two technologies run side by side: the 18th century and the 20th. The yoke of oxen next to a cultivator. If it weren't for the goggles, this worker could easily pass for a worker from the last century because of his clothing, etc. In a way, he looks like martian, so alien is he to the environment he inhabits.

Photo #3 **Cane fields** *(photo on page 12)*

There is an argument brewing here. The aggressive attitude symbolized by the presence of the machete. The aggression appears to be directed at someone or against nature, and fueled by the presence of adrenaline. Note the menacing movement of the machete, in perilous proximity to other workers.

Cacao harvesting in Bahia

Photo #4 **Cacaoeiro** *(photo on page 13)*

Unlike the photographs of sugar cane, in this view of the cacao plantation we cannot see the object of the worker's toil. The man is poised to harvest cacao which is just beyond our gaze. We can, nonetheless, see the primitive working conditions of an industry which has not changed significantly since the middle ages. Cacao workers are treated much more impersonally than sugar cane harvesters, who may not ever know who their boss or foreman are. There is less protection for the cacao harvester than for the boias frias. Alongside their harsh treatment is the lack of provisions for their families. Children and women, even pregnant women, frequently with side by side with the harvester without receiving sufficient or any compensation for their work.

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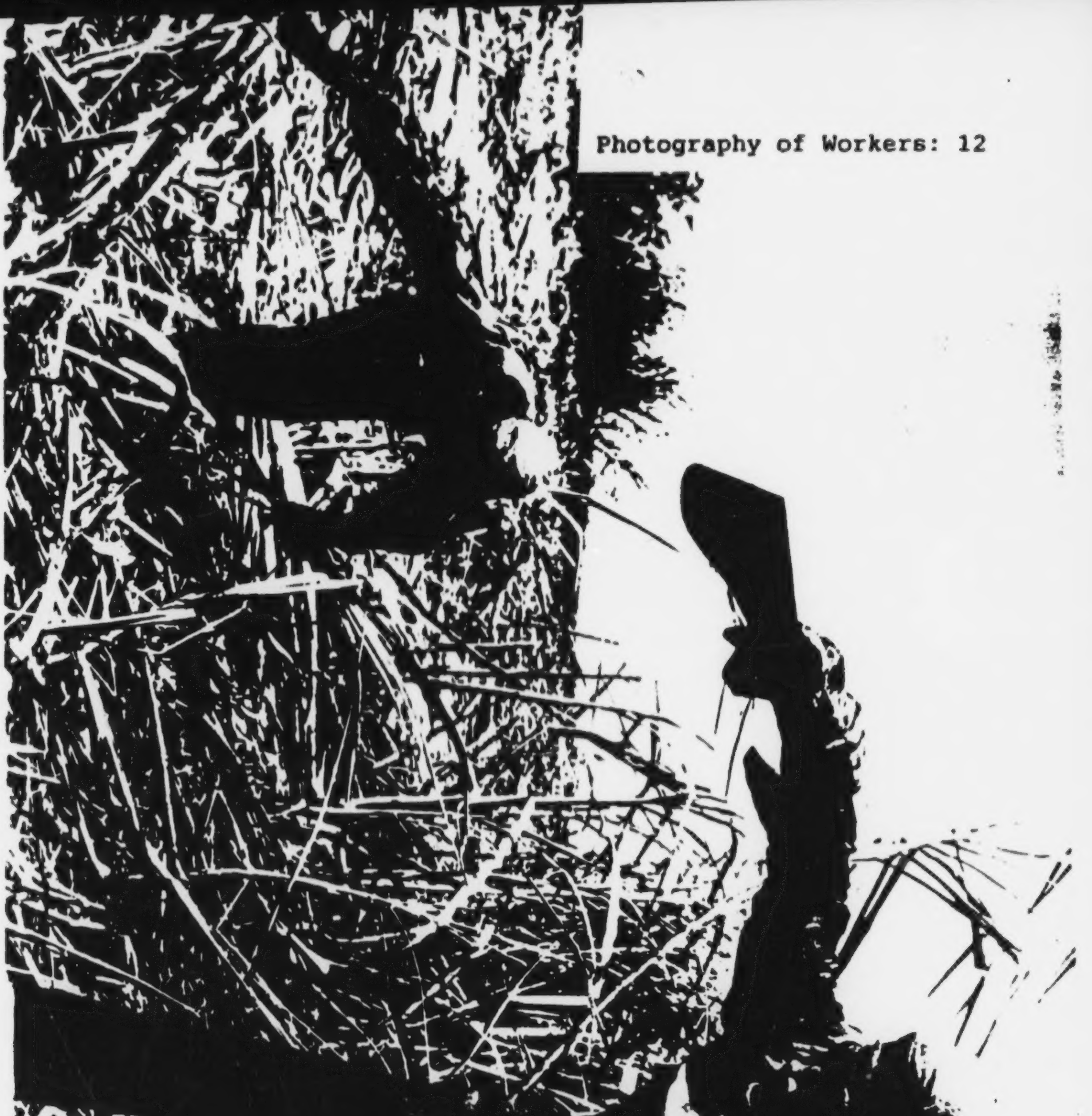
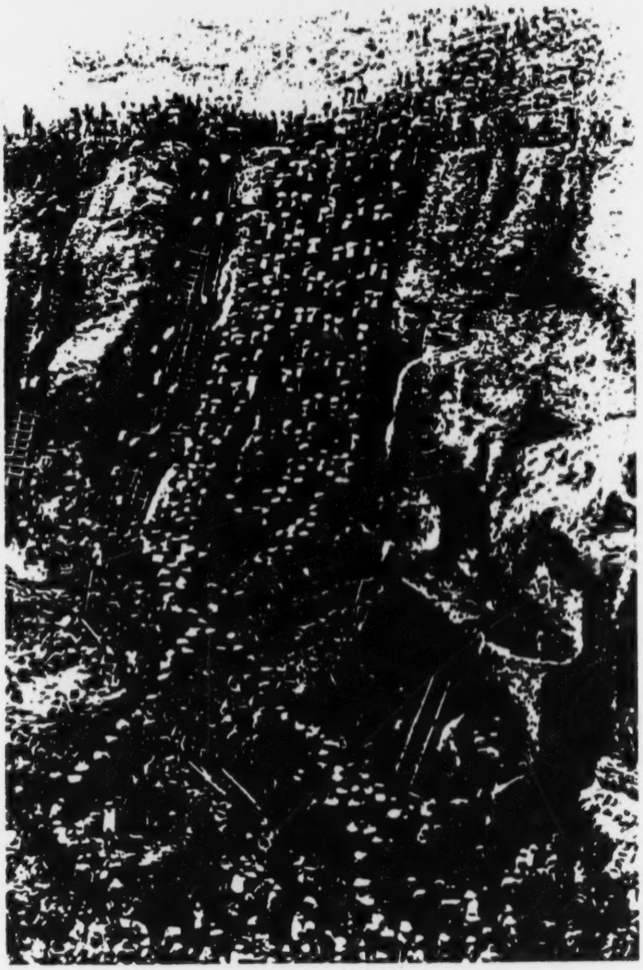
Photography of Workers: 12



Photography of Workers: 13

Gold Mining in Pará



Photo#5 **Serra Pelada**

At first glance, the image of workers in Salgado's photographs of the Serra Pelada gold mine resembles ants tunneling through the earth. While not precisely accurate, the resemblance is supported by the almost inhuman toil in which the workers are engaged. All day, and day after day, workers dig up their assigned parcel of land, fill sacks with soil to be assayed, and carry the dirt out of the mine on their backs.

To judge from these photographs and Salgado's own comments on the Dantesque atmosphere of Serra Pelada in his NPR interview, it is evident that workers in the Serra Pelada are among the most exploited in Brazil.

> The first time I came to the border of this huge hole where you have these fifty thousand workers more or less working together, I didn't believe, the sound that was coming from inside this hole was so special, so different and looking at all these people working together for me was incredible. . . Oh, my God, the sound of the gold mine. The gold mine sounded like the beginning of the time. When probably in the mines, the construction of the pyramids was like this. The first mines were like this. The same time, my mind changed that these men were extracting hundreds of thousands of kilos of gold, and this gold will not stay in their hands, this gold will be going out to the big banks of the world and at some point will go to your fort knox to be the reference of the power of the dollar. And sometimes you mind all this when you are shooting. All these contradictions around the life you are shooting. You must pay attention.

Open-pit gold mining at Serra Pelada provides one of the saddest displays of manual labor ever depicted as well as one of the industries which is most destructive to the environment. This mine was closed recently because of the rains had made it dangerous for the miners to traverse without betting caught in a mudslide.

As in the case of sugar cane. Serra Pelada existed because of the need to create new jobs in the North East. Furthermore, Serra Pelada was created by the military government to guarantee the production of gold for the Brazilian economy. Pursuing the ancient dream of "El Dourado," prospective miners came from all over Brazil and were subjected to terribly precarious working conditions. So massive was this accumulation of people involved in this common enterprise that it can only be compared with the large-scale construction of the great pyramids of Egypt. Salgado's photos are remarkable because access to the mine was severely limited by the military, and so he was not officially permitted to enter.

Some by products of this industry are pollution of the rivers through the use of mercury in the process of extracting gold, depression of workers because of their pitiable situation, alcoholism and prostitution as antidotes to depression, and violence. Photo # 309 appears to tell a violent tale. A policeman attempts to break up a conflict among the workers, and his own situation points up the difficulty of his work. Security officers are recruited from people who are not necessarily well trained for this work. And he is greatly outnumbered by the workers who look on with a mixture of responses. In any case, some of them are content to be bystanders, and if they join inn, they will not necessarily enter on the side of the security officer.

Photo#6 **Serra Pelada** Photography of Workers: 16

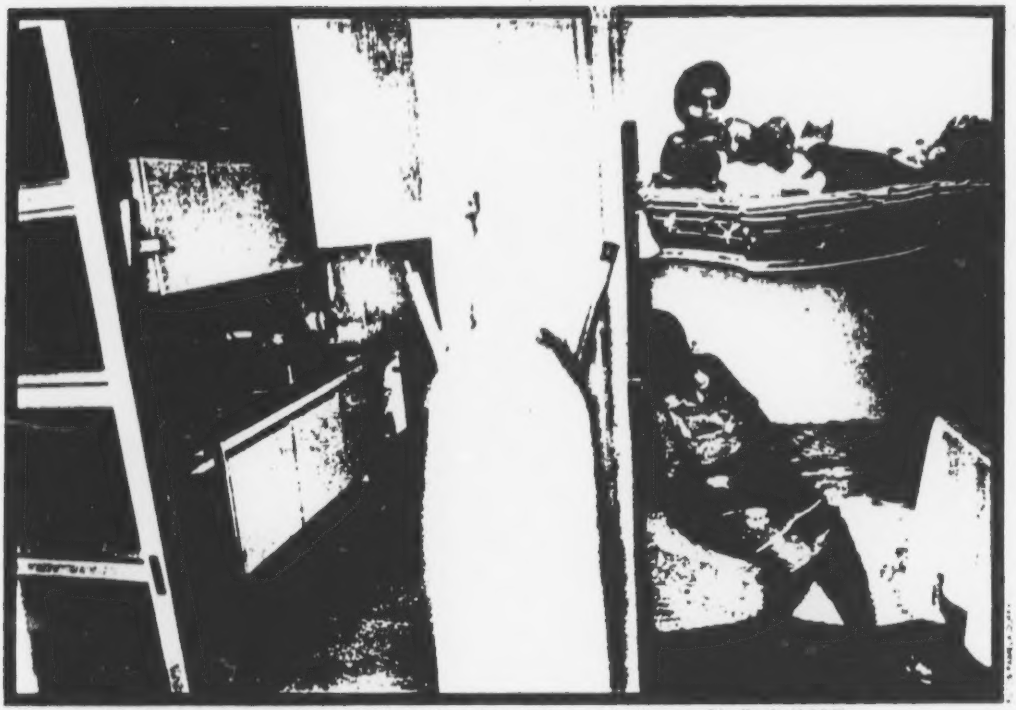
Domestic Servants: A Mulher Invisível

The following portraits of domestic workers from São Paulo and Rio de Janeiro were taken by Pamela Duffy. These images were featured in an exhibition entitled, "A Mulher Invisível" [The Invisible Woman] and were subsequently published as illustrations for an article in Veja [20 March 1991] entitled, "Na porta de serviço" [At the Servants' Entrance]. They serve as a fitting complement to Salgado's photographs of rural, manual laborers who are predominantly men. The pictures in this article offer a vision of female domestics [empregadas domésticas] in an urban setting. In the three photographs published in Veja, Duffy captures the poignancy of women who live on the fringes of Brazilian society, "essas cidadãs a quem os brasileiros sempre recorrem em caso de necessidade — mas em quem raramente se presta atenção" [those female citizens to whom Brazilians always turn in times of need but whom they rarely notice].

First, it is important to note that the institution of **empregadas** throughout the past two centuries has been a boon to women of the middle class, who have been permitted to enter into the working class. Half of those enrolled in aeronautical academies and more than half of the professorial class of brazil are women, and this is all due to the presence of **empregadas**, women who had no access to a quality education. And so thanks to domestic work, middle-class women can contribute to the economy. Unfortunately feminism has achieved little among the lower classes.

Residents of the US should realize how important having good, free, public education has been for economic development. This education of good quality permitted you to be a democracy. It is a shame, then, that more and more, the public schools in the USA are being unappreciated and undervalued. And now the US middle class is embarking upon the same wrong turn that the Brazilians took some time ago. If public education does not seem to perform up to its potential, then parents shift their children to private schools. In Brazil, education is the great social divider.

Frequently in Brazil there is the impression that the middle class has no interest in public education's improving because they are more interested in what will guarantee the progress of their children first, and if that means that their children will be better off in private schools then so be it. Remember that in your early public schools the teachers were not paid by the government but by the citizens themselves, sometimes through the local churches. If there is a lesson here it is that you should use your citizenship!



Sílvia com a filha Joana, em seu quarto, no apartamento onde trabalha, nos Jardins, em São Paulo (1987)

Photo #7 Empregada doméstica

Veja caption:

[Silvia with her daughter Joana, in their room in the apartment where she works, located in São Paulo's Garden district.]

The source of this form of labor, unfortunately, is linked to the difficult economic times of Northeast Brazil. Many workers have fled from the impoverished North including Bahia, to the Southern cities of Rio and São Paulo, the locale of these photos, for example. Lacking much or any formal education, they are relegated to unskilled work and receive extremely low pay. As a result, their low wages are insufficient to support themselves and their families which are frequently quite large. Their opportunities for self-improvement are limited by the nature of their work and their own backgrounds. **Empregadas** may have to work round the clock and, hence, have little free time to improve their education.

Domestics have a great deal of responsibility: cleaning the house, washing the laundry, cooking, caring for children. This is an exhausting job, and yet they earn pitifully little in the minimum wage. Of course, many of these empregadas reside in the homes they tend and, as they continue to be employed and earn greater trust of their host families, they receive more benefits and support. These workers frequently are on dury for practically the entire week and then get a day off either once a week or every two weeks.

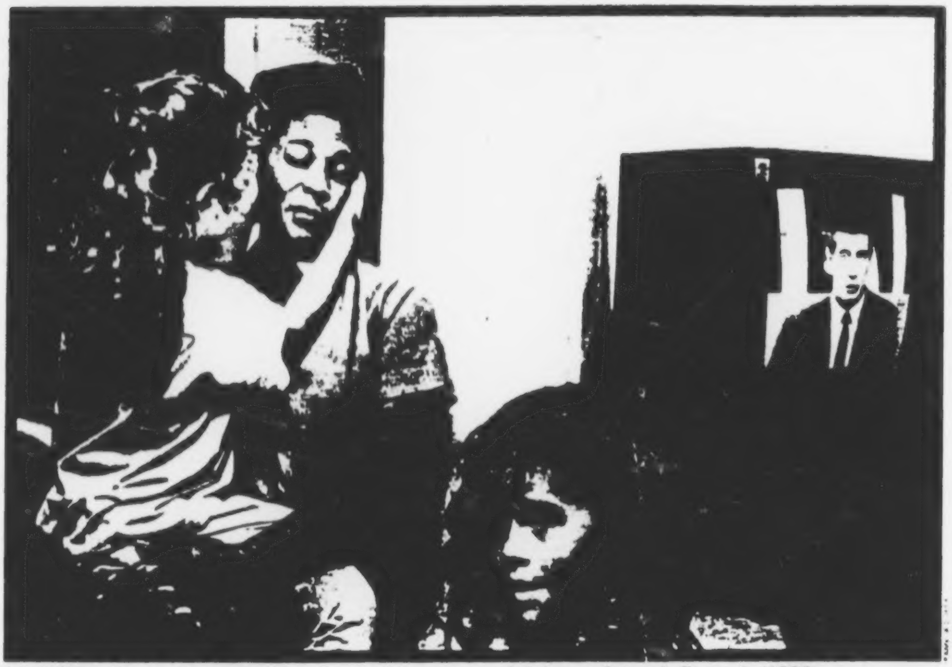
Eva, de 24 anos, dedica-se à faxina no apartamento de um edifício de luxo no bairro do Jardim Paulista (1989)

Photo # 8 Empregada doméstica

Veja caption:

[Eva, age 24, cleans an apartment in a luxury building located in the Paulista Gardens district (1989).]

The photo of the apartment in SAo Paulo is reminiscent of something else. During the 70s, there was an enormous increase in urbanization and a corresponding increase in real-estate speculation, because real estate was the most lucrative investment for banks. Real estate development. It was at this time that the space available for domestics was reduced radically. New apartments contained minuscule cubicles for domestics into which only a bed.



A babá Hagemira em ação, com a criança de que cuida, numa casa do bairro paulistano do Pacaembu (1990)

Photo # 9 Empregada doméstica

Veja caption:

[Hagemira, a nursemaid, with the child she tends, in a house located in the Pacaembu district of São Paulo.]

With respect to the work of household servants, this kind of labor has become so important in Brazil, especially in the large cities like São Paulo. Today, domestics have improved their working conditions. They have the benefit of professionalism. What is evident in these photos is the confusion of roles of domestic and parent. As you can see, the maid who is caring for the children may have as much responsibility as their own parents.

Photo credits:

Pamela Duffy, "Na porta de serviço," Veja, 20 março 1991, pp. 94-6.

Sebastião Salgado, Workers: An Archaeology of the Industrial Age (New York: Aperture, 1993), pp. 23, 26-7, 28-9, 64-5, 308-9, 314.

Fulbright-Hays Seminar Abroad Program

Brazil 1994

Enviormental Issues in Brazilian Society:
A Photographic Assessment reflecting the Degradation of the Atlantic Rainforest of the Serra do Mar, Cubatão, São Paulo, Brazil

Gordon F. Kells
Professor of Geography
Mott Community College
Flint, Michigan 48503

The Degradation of the Atlantic Rainforest of the Serra do Mar
Cubatâo, Sào Paulo, Brazil

Gordon F. Kells
Professor of Geography
Mott Community College
Flint, MI 48501

ABSTRACT

For the past several decades, international attention has been focused on the degradation of the Amazon Rainforest and the potential global ramifications of its demise. Scant attention has been given to another rainforest in Brazil that has undergone almost complete destruction. The Atlantic Rainforest of coastal Brazil was, at one time, equal to the Amazon's in size. Since the 16th century, this ecosystem has suffered large scale destruction by man through uninterrupted felling of its timber, indiscriminate hunting and sale of the forest's unique fauna. Irrational agricultural practices and land use systems has reduced the Atlantic Rainforest of the Serra do Mar to 5% of its original size. This study examines 20th century agents, most notably industrial pollutants and acid rain, as man's newest assault on this unique ecosystem.

KEY WORDS: Brazil, Sao Paulo, Cubatao, degradation, Atlantic Rainforest, Serra do Mar, Santos Lowlands, Acid rain, atmospheric pollution.

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The purpose of this project is to give students a better understanding of the environmental issues facing contemporary Brazilian society. I hope to accomplish this through a series of classroom audio-visual presentations. A 1994 Fulbright - Hays Seminar Abroad Program in Brazil has afforded me the rare opportunity to photograph a number of difficult environmental conditions such as, the encroaching human presence in the breeding grounds of rare species in the Pantanal, the industrial pollution and acid rain affecting the Atlantic Rain-forest of the Serra do Mar of south eastern Sao Paulo State and Brazil's disturbing urban centers, where pollution has created some of the worst living conditions on the face of the earth.

Purpose

For the purpose of this project, only one situation will be selected and developed The Effects of Industrial Development on the Atlantic Rain forest of the Serra do Mar of Southeastern Sao Paulo State. Future presentations will be developed at a later date covering those topics not included in this specific project.

Objectives

It is hoped that this project and future presentations of these audio-visual materials will contribute to the learning experience of the students. It is also my purpose to eliminate many misconceptions Americans have about Brazil and help the students compare their own environmental situation with that of their Brazilian counterparts. Questions will be formulated from the presentations that will help to promote critical thinking about environmental issues both home and abroad. It is hoped that this particular program and future programs in this series will be available to a wide audience through videotape.

Target Audience

This project is recommended for many different audiences both in and out of the formal academic setting. In the academic arena, I believe the program to be oriented toward the advanced high school student or introductory college level student in a variety of disciplines ie; environmental science, urban planning, geography and economics. In the non-formal academic setting this project can be used as a community out reach program for many religious, environmental and civic organizations.

Visual Materials

The basis for the visual material is over 1,000 images on 35mm slides, taken by the author during his 1994 fellowship in Brazil. The slides have been selected and catalogued into several topical categories which include air pollution and acid rain. This particular paper is in the form of a video script with pictures and accompanying narrative. Besides slides of the actual setting, other graphics, introduction slides, tables, maps and graphs have been developed and included.

This particular program is designed to take approximately 45 to 50 minutes and will include 40 slides, narrative and music.

Format

For this and future presentations, the same basic format will be followed , thus providing continuity to the entire project. The three basic subdivision to be used are as follows: 1) The Setting, 2) The Cause, and 3) The Results. The setting will include the general geography of the region effected, i.e. location, its physical geography, geology, geomorphology, hydrology, localized weather, climatology, soils, natural vegetation cover etc. . The cultural geography will include demographic data, settlement and land use patterns, history and economic development. The section on the causes of the environmental disturbance will describe in detail, the true nature of the dilemma. topics covered will include industrial pollutants, over population and unplanned economic growth. The last section will concentrate on the results of environmental abuses in a simplified "cause and effect " relationship, which is never really "simple".

Introduction

As recently as the middle of this century, tropical rain forests covered approximately 15 percent of the earth's surface. By 1975, this percentage had declined to 12 percent. At the present rate of decline, it's estimated that this figure will drop to a mere 7 percent by the year 2000. By contrast, the Atlantic Rain Forest of eastern Brazil covers only 5 percent of its original size. Some of this degradation was and is by natural means, but in the case of the Atlantic Rain Forest, the damage is primarily caused by the activities of man. These activities include imprudent agricultural methods, deforestation through commercial logging, over-grazing of livestock and most recently acid rain caused by industrial pollution.

For four centuries (1500-1900) the slopes of the Serra do Mar were relatively free of human activity. These slopes were considered too steep for traditional human activities such as large scale farming, logging and livestock ranching. Some human activity was present, such as construction of roads, railroads, and harbor facilities, which served the expanding hinterland of the Plano-Alto of Sao Paulo State. But it was not until the turn of the century (1900), with the beginning of industrial development and urban expansion did the rain forest begin to show any major signs of damage. Increased felling of trees for the charcoal and industry was the first major impact on the native vegetation.

Toward the end of World War II, the entire Santos lowlands underwent large-scale urban expansion brought about by industrial development. This lowland development was primarily designed to assist the expanding service area of the city of Sao Paulo and westward. Industrial activities included petroleum refining and petrochemical, fertilizer, and steel production. All of these industries produced a notable increase in air pollution.

The impact of these higher levels of pollution on the native vegetation was pronounced. This damage is especially visible in areas where topographic and climatic conditions are such that they trap high concentrations of gas and particle matter in the valleys and ravines. The degradation of the flora and fauna can be visualized in the form of yellowed or "burnt" leaves. The more sensitive varieties of plants are weakened and the trees perched on steep slopes often die. As this occurs, soil is exposed to rain and runs off. When the soil is less stable, mud flows and land slides often occur. This movement erodes the upper reaches of slopes and inundates the lower elevations with deposit materials, burying the vegetation at that level. It is this problem and others that this paper and accompanying visual aids will document and describe.

Location

The area under study is located on the Atlantic coastal plain of Sao Paulo State, approximately on the Tropic of Capricorn (23 1/2 S Latitude). Sao Paulo State is but one of the 26 states in the Brazilian Federation It is located in the region the Brazilian government refers to as the Southeast (fig 1) The state's relatively small size, approximately 250,000 square kilometers, belies its importance It is unquestionably the most important area in terms of population Over 33 million people, 20 percent of the nation, reside in this state Economically, this area is ranked number one

Geology and Land forms

The study area is situated between the Atlantic Ocean and the Planalto Brasileiro (Brazilian Highlands/ Plateau) Two specific physiographic realms, the coastal plain known as the " Santo Lowlands" and the escarpment called the Serra do Mar are located within the study area (Fig 2)

The Planalto Brasileiro is a remnant of Gondwanaland, an ancient super-continent of 180 million years ago (Fig 2) South America resides on the South American Plate which is currently moving westward and rotating clockwise This westward movement is widening the Atlantic Ocean The sea level contour line of eastern South America matches the sea level contour line of the western African coast. The rocks of the Planalto are very old, some over 2 billion years, and provide evidence of earlier continental movement On its Atlantic (eastern) flank, the high Planalto drops off abruptly, creating the escarpment which is the Serra do Mar At the foot of this escarpment lies the coastal plain

The shaping of this escarpment has resulted in the development of the coastal plain known as the Santos Lowland (Fig 2) The plain has evolved through the deposition and accumulation of eroded materials from the scarp at its base The coastal plain has undergone considerable change during the

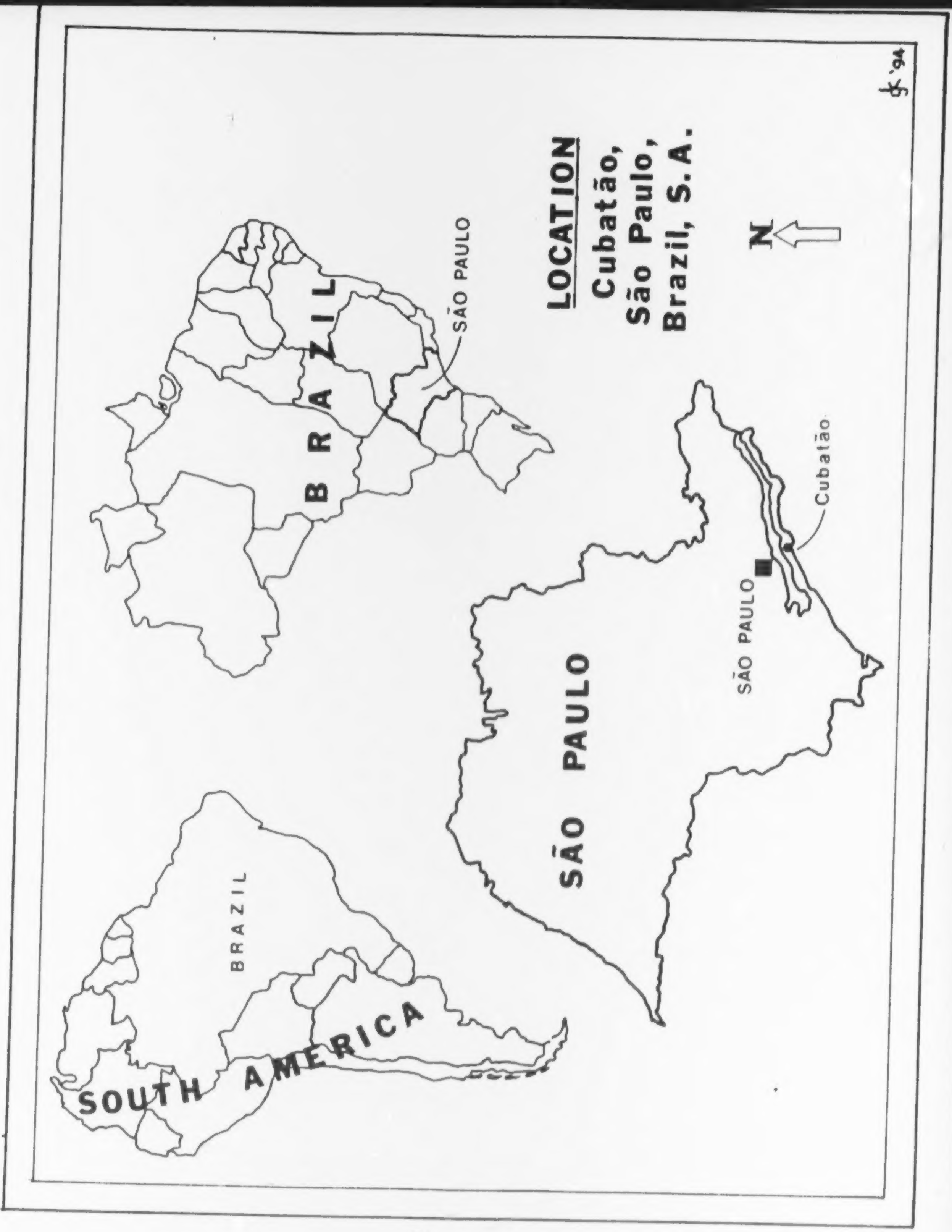
LOCATION
Cubatão,
São Paulo,
Brazil, S.A.
N
BRAZIL
SÃO PAULO
SÃO PAULO
SÃO PAULO
Cubatão
SOUTH AMERICA
BRAZIL

Fig. 1

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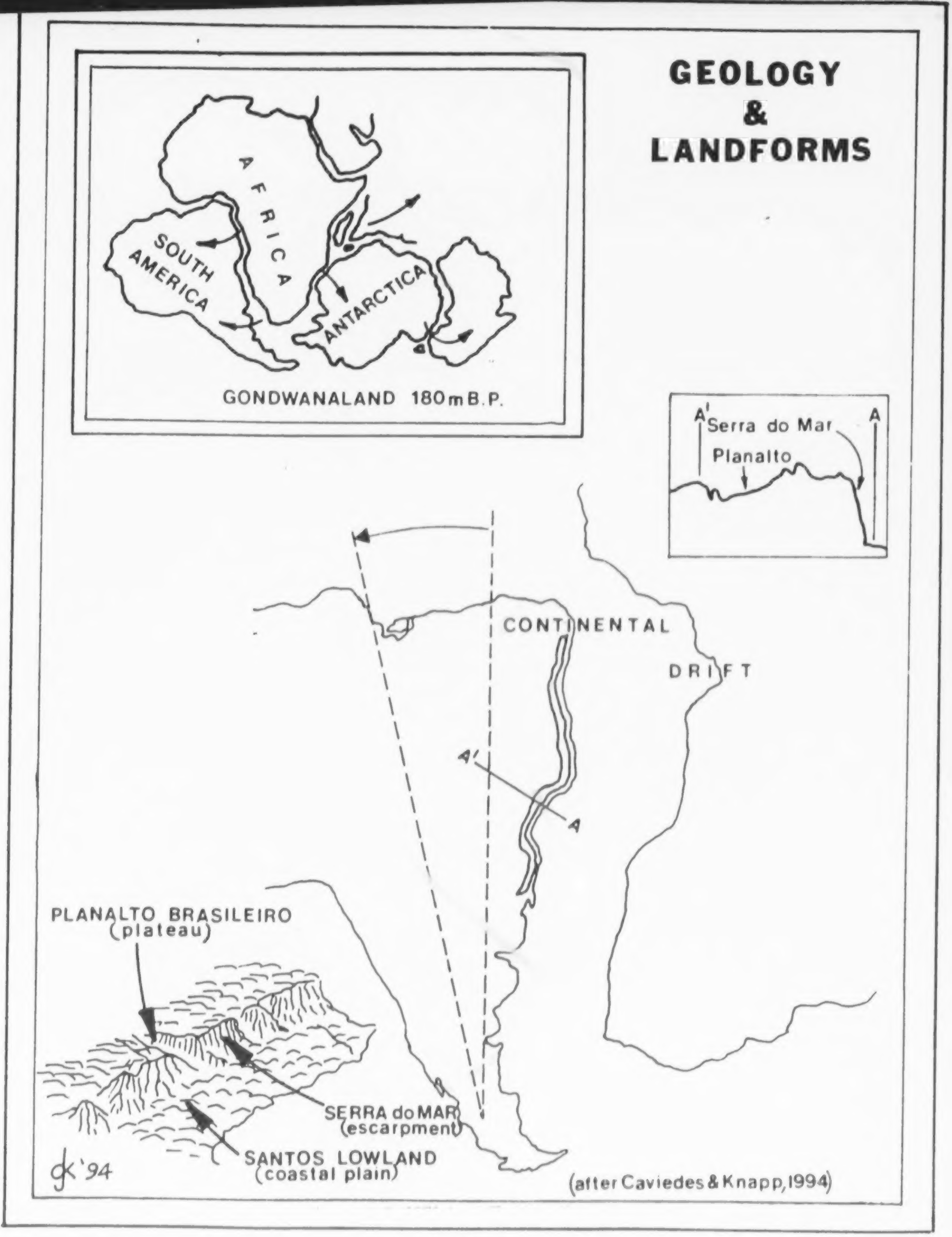

GEOLOGY & LANDFORMS
AFRICA
SOUTH AMERICA
ANTARCTICA
GONDWANALAND 180m B.P.
A'
Serra do Mar
A
Planalto
CONTINENTAL DRIFT
A'
A
PLANALTO BRASILEIRO (plateau)
SERRA do MAR (escarpment)
SANTOS LOWLAND (coastal plain)
ck '94
(after Caviedes & Knapp, 1994)

Fig. 2

Quaternary Period (last 2 million years) as a result of successive variations in climate and rising and lowering sea levels.

Weather and Climate

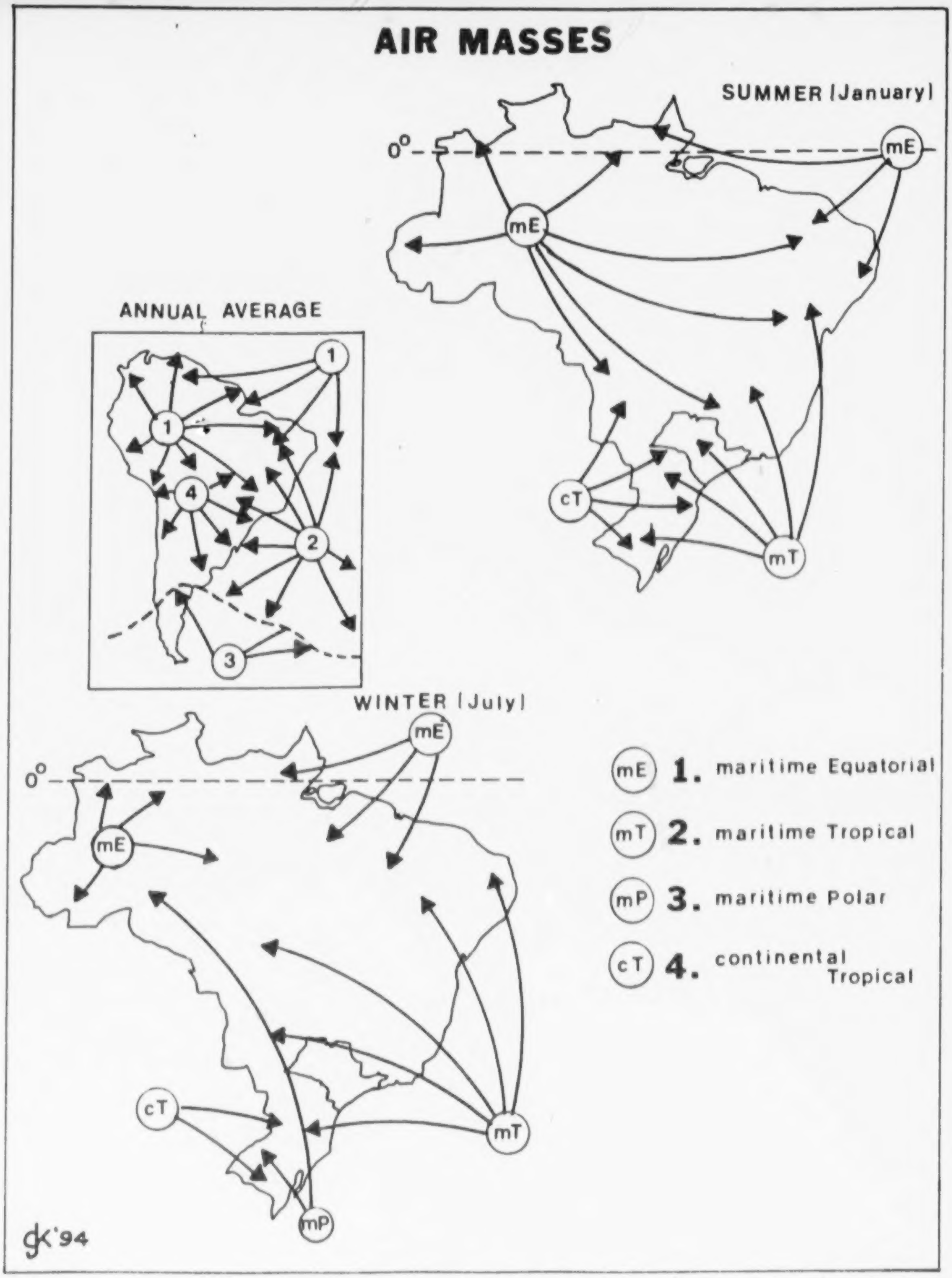
The Serra do Mar and the Santos Lowlands have a climate that is characterized by warm to high temperatures, mist and clouds with high humidity and abundant precipitation.

Maritime air masses sitting offshore are pushed toward land by the strong subtropical high pressure systems (Fig.3). As this air is pushed towards shore it passes over the warm Brazilian currents that are drifting poleward along the coast from the equator. This warm moist air is carried to the shore by the prevailing winds and is pushed upward orographically on the windward slopes of the Serra do Mar. Cooling adibatically, this air soon condenses and clouds form, obstructing the view of the summit. As the clouds enlarge and thicken, precipitation soon follows (Fig.3). Rainfall is most abundant during the summer months (Fig 3), raining on almost 50 percent of the days. During the winter season, air masses of continental origin and relatively dry, reduce the amount of rainfall. In the winter only 30 percent of the days receives rain.

The rain is most abundant at the summit and higher elevations of the escarpment. During the rainy summer season, average annual rainfall is in excess of 4,000mm diminishing down slope. At the base of the escarpment and on the coastal plain, rainfall drops to approximately half. When it is not raining, mist is ever-present, especially at the higher elevations. This mist, as well as the rain, contribute to the region's persistent high humidity.

Soils

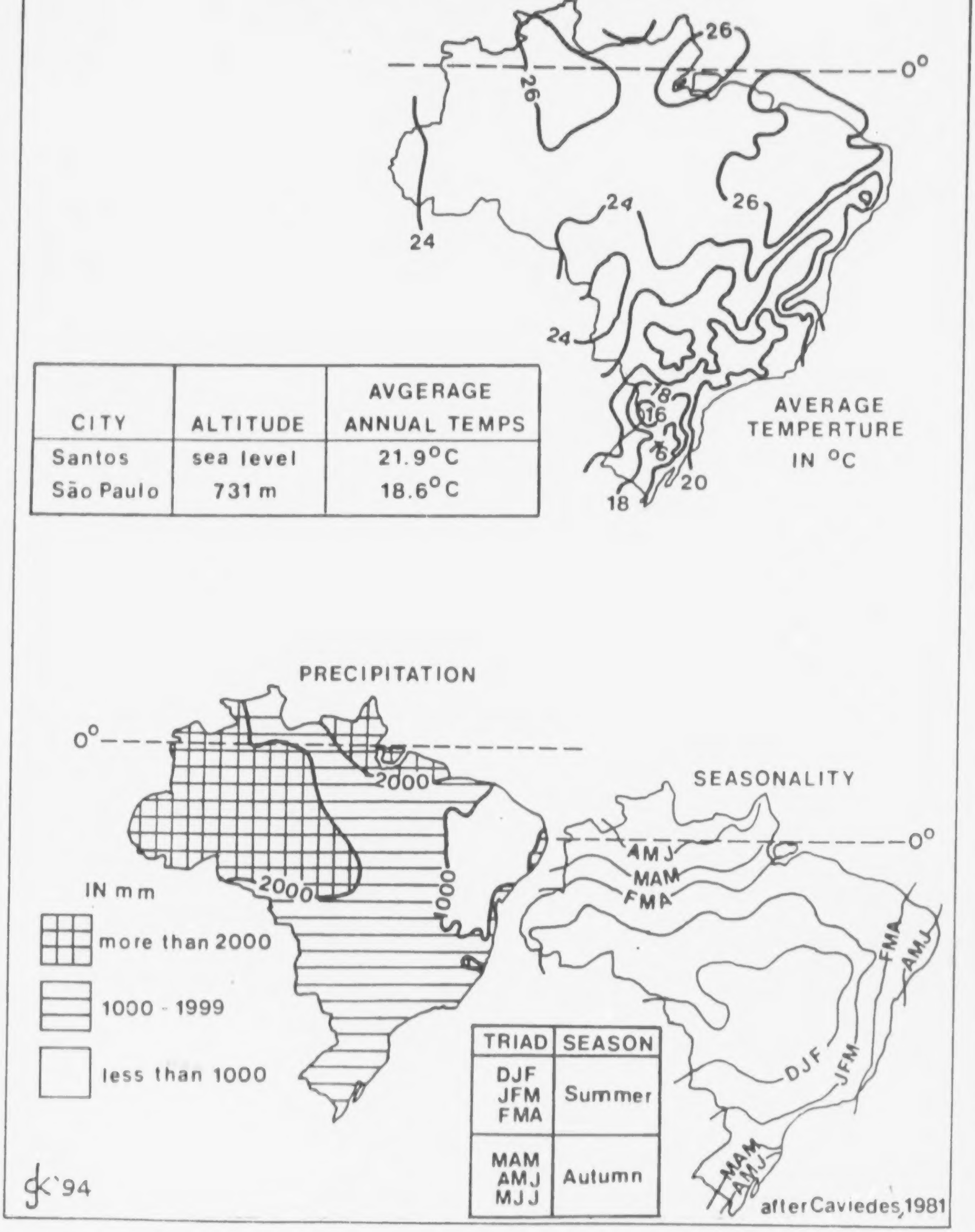
The steep slopes of the escarpment are covered with soils which are in some places deep (red-yellow oxisols) and in others shallow and to some extent bare and rocky (lithosols). Oxisols are the most common soils found on the tropical shields and especially the windward slopes of the Serra do Mar. Warm


AIR MASSES

SUMMER (January)
0°
mE
mE
cT
mT
ANNUAL AVERAGE
1
1
4
2
3
WINTER (July)
0°
mE
mE
cT
mT
mP
mE 1. maritime Equatorial
mT 2. maritime Tropical
mP 3. maritime Polar
cT 4. continental Tropical
gK'94

Fig. 3

WEATHER ELEMENTS


26
26
26
0°
24
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24
24
18
16
16
20
18
AVERAGE TEMPERTURE IN °C
PRECIPITATION
0°
2000
2000
1000
IN mm
more than 2000
1000 - 1999
less than 1000
SEASONALITY
0°
AMJ
MAM
FMA
FMA
AMJ
DJF
JFM
MAM
AMJ
gK'94

CITY	ALTITUDE	AVGERAGE ANNUAL TEMPS
Santos	sea level	21.9°C
São Paulo	731 m	18.6°C

TRIAD	SEASON
DJF JFM FMA	Summer
MAM AMJ MJJ	Autumn

after Caviedes, 1981

Fig. 4

water continuously removes organic matter and silicates from the soil in a process known as leaching. The result is an accumulation of rusted or oxidized iron and aluminum particles, which give the soil a reddish cast.

In the Atlantic Rain Forest, leaf litter is quickly decomposed. Nutrients spend little time in the soil and are rapidly absorbed by the tree roots. Hence, the nutrients of the rain forest are in the trees themselves and not in soils. When these trees are cut and cleared most of the nutrients are irrevocably lost. Despite the appearance of lushness, tropical soils are sterile and poor for long term agricultural activities. What nutrients are left, will suffice for just a few good years and then these soils too will be depleted.

Vegetation

The original Atlantic Rain Forest was a complex flora formation that was as rich and varied as the present day Amazon's. Where the flora still exists, the vegetation is dense and the trees dominate. The forest initially extended in the north , from the state of Rio Grande do Norte, southward to the state of Rio Grande do Sul (Fig. 5).

The Atlantic Rain Forest is compartmentalized in terms of latitude and altitude. It is discontinuous along its entire length, with numerous open spaces reflecting human activity. One of the longest continuous strips is located on the steep slopes of the Serra do Mar of Sao Paulo State (Fig. 5). Initially considered to be too steep, with poor economic potential, it was spared from human intrusion for a long period , but not forever.

The trees of the Atlantic Rain Forest do not achieve the same height as those in the Amazon and seldom exceed 30 meters. The trunks are thick and the canopies frondose as a consequence of the elevation. The primitive forest has been replaced to a greater or lesser degree by second growth forests on the scarp face of the Serra do Mar. The trees used in the replacement process are far less diversified in species, although more tolerant to certain types and amounts of pollution. These new species have proven to be inadequate in their ability to provide soil stability.

VEGETATION

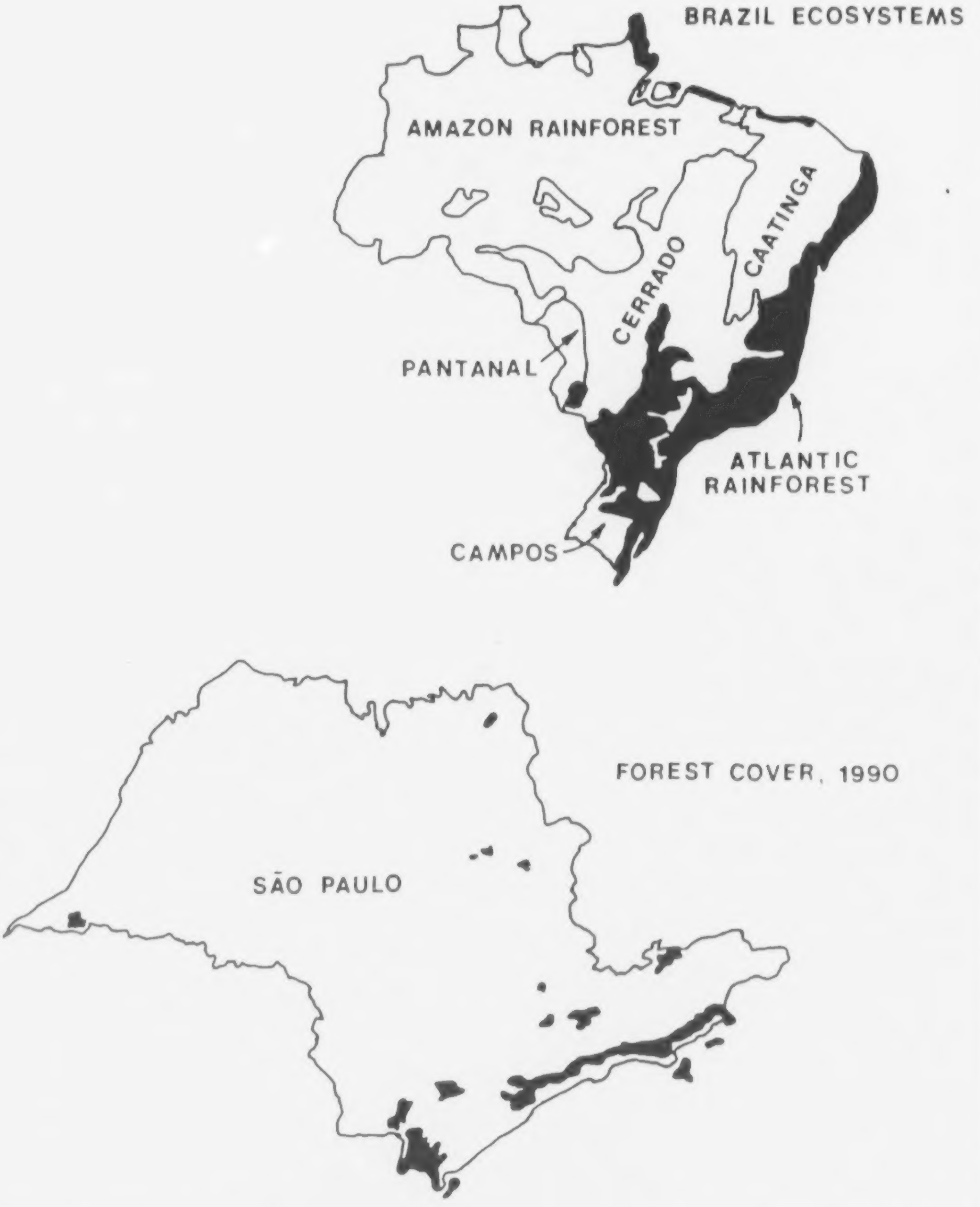
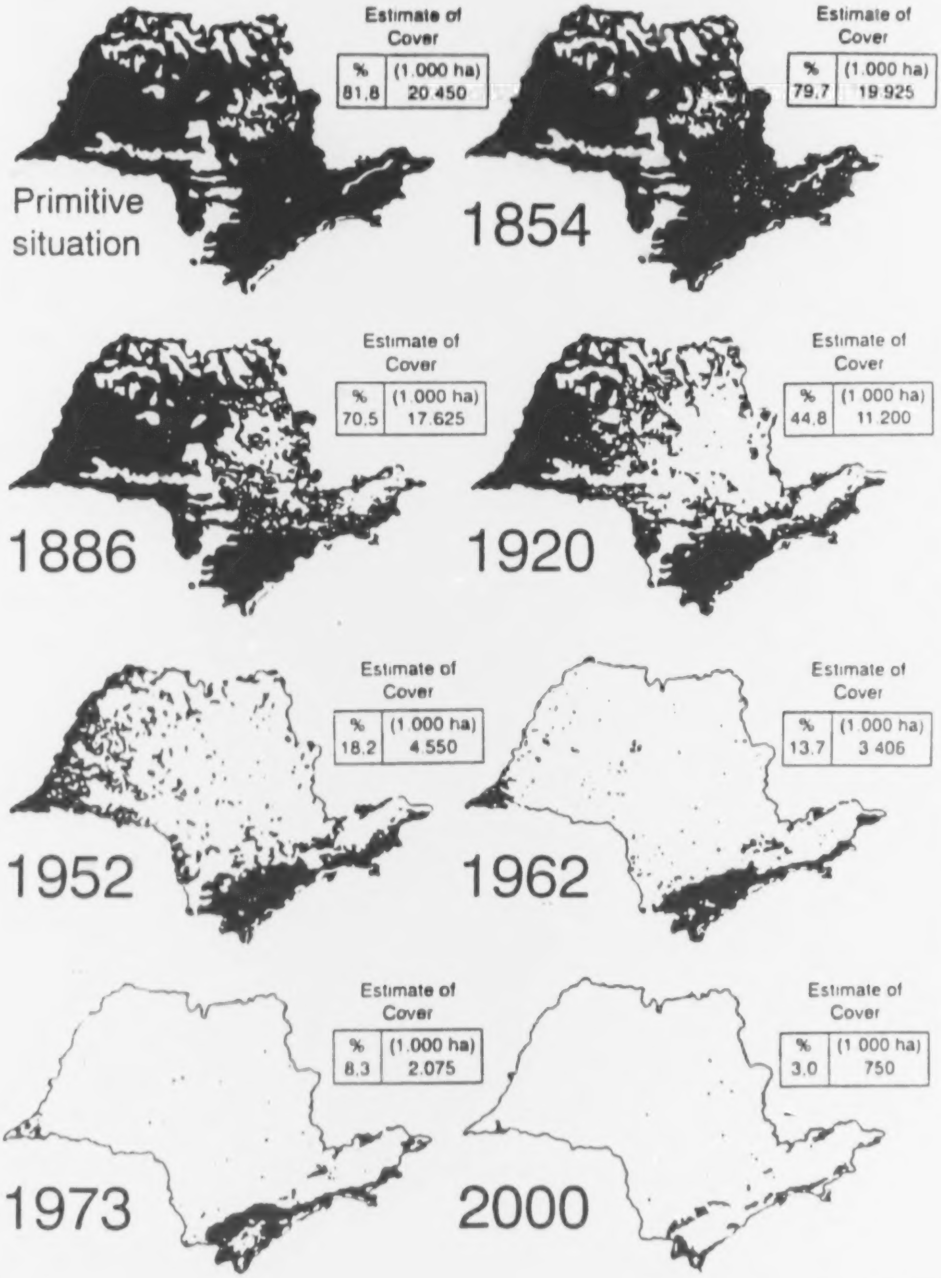

BRAZIL ECOSYSTEMS
AMAZON RAINFOREST
CAATINGA
CERRADO
PANTANAL
ATLANTIC RAINFOREST
CAMPOS
FOREST COVER, 1990
SÃO PAULO
gk'94

Fig. 5

Restoration of Forest Cover of the State of São Paulo


Primitive situation
Estimate of Cover
% 81,8
(1.000 ha) 20.450
1854
Estimate of Cover
% 79,7
(1.000 ha) 19.925
1886
Estimate of Cover
% 70,5
(1.000 ha) 17.625
1920
Estimate of Cover
% 44,8
(1.000 ha) 11.200
1952
Estimate of Cover
% 18,2
(1.000 ha) 4.550
1962
Estimate of Cover
% 13,7
(1.000 ha) 3.406
1973
Estimate of Cover
% 8,3
(1.000 ha) 2.075
2000
Estimate of Cover
% 3,0
(1.000 ha) 750

Source: SÃO PAULO [State of] Secretariat for the Environment - CETESB, SÃO PAULO 92 - Environmental profile and strategies, São Paulo, 1992, 148pp.

Fig 6

The amount of natural vegetation and forest cover in São Paulo State has been reduced considerably over the past 100 years (Fig.6). In 1854 almost 80 percent of Sao Paulo State still had forest cover. In 1973 this amount was reduced 8.3 percent. If the present rate of deforestation continues, the projection is that only 3 percent of the forest will remain by the year 2000.

History

Cubatão began as a small port town between the major port city of Santos and the newly emerging city of São Paulo on the planalto. To reach São Paulo, travelers first had to overcome the steep slopes of the Serra do Mar. The Portuguese first built a trail/road in 1560 but it was extremely rough. This road was improved in 1790 but still was only usable to those on foot, horse or mule. By 1867 the first railroad was put into operation by the Sao Paulo Railway Company. Towards the end of the nineteenth century, communications between the coastal plain and the plateau were expanded with an additional railroad and two new highways. Today, the region is fully integrated, from a transportation and communication perspective, with telecommunications, air transport and pipelines.

The opening of these connections between coast and plateau stimulated the development of commerce and industry, creating towns such as Cubatão. Cubatão soon emerged as a leading center of commerce because of its strategic location. It was a place where people or commodities destined for either Santos or Sao Paulo had to stop to change modes of transportation (from water to land or vice versa).

The same transportation links that provided for the development of the Planalto were also the first elements of forest exploitation. Initially the strips of logging used for road and railway construction was minimal. But as towns grew, clearing of the forests for town development, agriculture, grazing and other human needs soon took its toll on the forest resources.

At the end of World War II, Brazil emerged as a fledgling industrial nation. Cubatão showed signs of emerging as a major industrial center. First, a ~~hydraulic~~ hydroelectric facility, complete with dam, reservoir, and generating station was built. This was soon followed by iron and steel mills, petroleum refineries, petrochemical factories and fertilizer plants. The population of Cubatão has grown commensurate with its industrial growth, reaching over 90,000 in 1990.

Results

The interplay of man and nature on the Serra do Mar is a perfect example of environmental degradation, the magnitude of which, demands new alternatives for reclaiming the natural environment

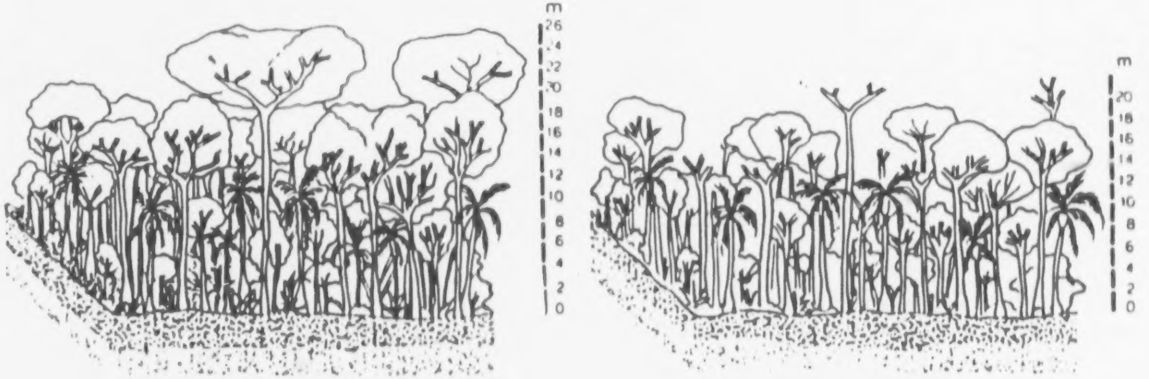
For more than twenty years, the smoke stack industries of the Cubatao's industrial complex have spewed into the atmosphere their thick pollutants. These air-borne pollutants have caused the disappearance of the natural forest cover (Fig 7). Gone are the great trees and the tall palms of the ancient forest. What is left is dead tree trunks, the so-called "toothpicks". Whole ecological systems have disappeared. In the wetlands of the lower Rio das Pedras, the entire forest has died. Natural regeneration of this area, which could lead to the formation of a new woodland, seems unlikely. This entire wetland has been taken over by the less desirable species of ferns and other herbs.

Besides whole areas being completely degraded, many more ~~are~~ show signs of only partial decay. These are are characterized by the death of innumerable trees and a reduction in the number of epiphytes. Under the effects of air-borne pollutants, tree species have been replaced by bushes and shrub-like plants from elsewhere.

The amount and condition of the vegetation has an important part to play in the retarding and inhibiting of landslides. The vegetation intercepts, holds and absorbs a parts of the water resulting from rainfall. The vegetation canopy directly reduces the effects the force the falling rain has on the soil. It reduces the rains erosive action, therefore, the runoff. This runoff reduces the volume of soil in and around the root system, therefore destabilizing the entire tree. Advanced stages of forest degradation has made it possible for various, sometimes serious landslides to occur. These landslides are evident and easy to spot as they leave large scars on the mountainsides

The people of Cubatão are personally threatened by these landslides of soil, rock and debris. Many of the industrial plants and storage facilities of Cubatão are constructed at the base of the Serra do Mar. In

Fig.7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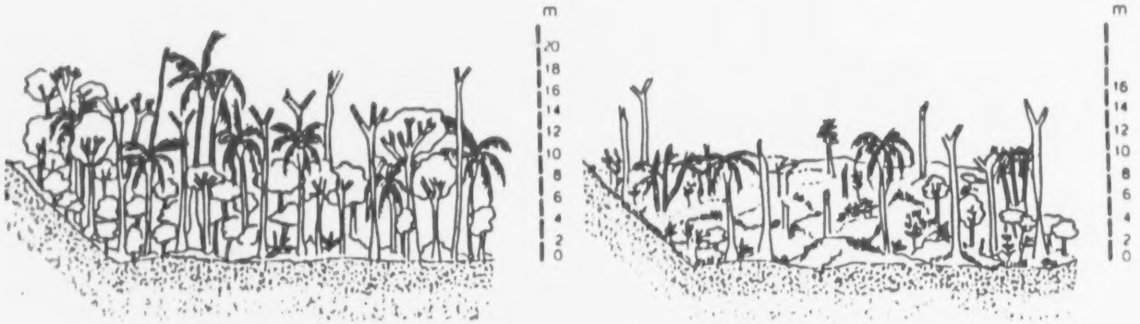
Primitive state

Beginning of degradation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The advance of degradation

Degraded state

Source: SÃO PAULO (STATE OF) Secretariat for the Environment, SERRA DO MAR: Degradation and Reconstitution, São Paulo, 1990 the summer of 1985, after a season of exceptionally heavy rain, a landslide occurred which could have brought about an environmental disaster on a par with the Union carbide incident on Bhopal, India or the nuclear meltdown in Chernobyl, Ukraine. A landslide of considerable magnitude brought rock debris within a few meters of an ammonia storage tank belonging to the Ultrafertil fertilizer plant. Penetration of that storage tank and the releasing of the ammonia fumes into the environment, could have been a particularly deadly situation for the residents of Cubatão and beyond. The risks arising from the instability of the hillsides above the residential neighborhoods are also obviously a concern.

Solutions

The reconstruction of the vegetation cover is fundamental to the survival of the Serra do Mar. All effort to restore the forest will be for naught if effective pollution control methods are not implemented.

The government of the State of São Paulo has for sometime been concerned with the degradation of the Serra do Mar and the potential consequences of a major ecological disaster. The large scale landslide of 1985 gave way to a series of measures aimed at correcting some of these problems. These measures included, but were not limited to the following: emergency plans for the safety of the populace of the Cubatão area, reconstruction of the mountainside vegetation, a series of engineering projects aimed at limiting potential hazards, and better pollution control.

Emergency plans for the Cubatão region now consists of a series of measures designed to minimize the risks imposed by landslides in the higher elevations of the escarpment. The major concern is the "snowballing effect" and its potential impact. As the slips and slides pick up momentum, they may attain such proportions that on reaching the lowlands, they could destroy everything in their path. These emergency plans were based on the probability that the occurrence of landslides are predictable. Although it is not possible to prevent landslides from occurring, by careful observation and systematic monitoring of rainfall indices, an early warning system can save lives and property if sufficient time is allotted to put preventative measures into operation.

The restoration of the forest cover was considered fundamental to the re-establishment of the natural equilibrium of the Serra do Mar. A number of scientific studies were undertaken, designed primarily to increase understanding of the role forest cover plays in the process. The studies also provided guidance for the policy makers as to how this undertaking should proceed. The planting of seeds and seedlings was undertaken by the Institute of Botany and the Forestry Institute in 1985 and 1986. This program called for the use of native pollution-resistant species. New methods of planting, including sowing seeds from a helicopter, were pioneered. This method was especially useful in areas too steep to allow manual labor.

The State of Sao Paulo and private industry undertook the challenge of constructing retaining walls between the hillsides and the factory buildings and storage facilities. These walls were intended to hold back or greatly reduce the impact of the debris brought down by a landslide. Companies reduced stocks of dangerous substances or moved them out of harms way. There are also evacuation plans for the population as well as a program for the elimination of residential dwellings in potentially high-risk areas.

Over the past decade the government of the State of Sao Paulo has made a concerted effort to control air-borne pollutants from industrial sources. Over the last 30 years, atmospheric pollution, in the form of acid rain and particle dust, has brought about the deterioration of about 60 square kilometers of the Atlantic Rain Forest. These pollutants, known to have a deteriorating affect on plants, are: gaseous fluorides, sulfur dioxide, oxides of nitrogen, ammonia, hydrocarbon and a variety of dusts. As a result of the government's pollution control edicts and industries' voluntary efforts, the daily emission of these pollutants have diminished greatly.

Conclusions

In and around the City of Cubatao, human interference, especially pollution, has brought about the present condition of degradation of the Atlantic Rain Forest of the Serra do Mar. This wholesale destruction has caused the disappearance of innumerable plants and a consequent reduction in the forest's bio-diversity. Scientific research has provided insight into the processes of forest degradation and given guidance toward solutions. Scientists have identified species already extinct, those on the endangered list, The restoration of the forest cover was considered fundamental to the re-establishment of the natural equilibrium of the Serra do Mar. A number of scientific studies were undertaken, designed primarily to increase understanding of the role forest cover plays in the process. The studies also provided guidance for the policy makers as to how this undertaking should proceed. The planting of seeds and seedlings was undertaken by the Institute of Botany and the Forestry Institute in 1985 and 1986. This program called for the use of native pollution-resistant species. New methods of planting, including sowing seeds from a helicopter, were pioneered. This method was especially useful in areas too steep to allow manual labor.

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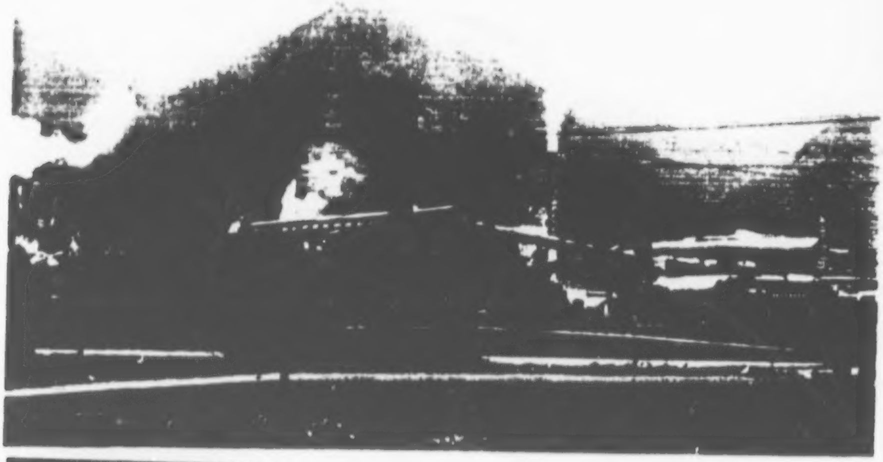
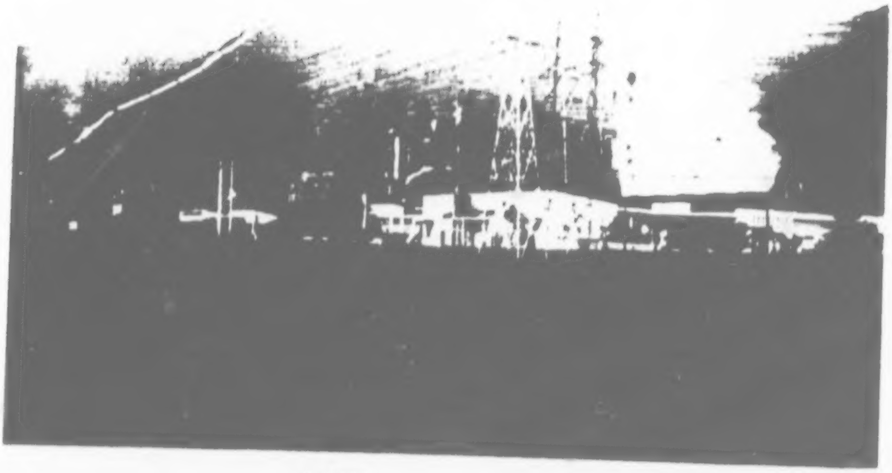
PAGE 20 IN THE ORIGINAL COPY RECEIVED BY ERIC IS A DUPLICATE OF PAGE 19 and those with the capacity to flourish. Research has provided the means to recognize the various stages of degradation and take preventative or corrective action as needed.

Numerous activities have started to restore the forest to its natural state: the transportation of the native species to the bare soils of landslides, manual planting of saplings on accessible slopes, aerial sowing on inaccessible slopes and the use of pioneer species from other parcels of the Atlantic Rain Forest. All of these methods show promise and a dedication to the goal of keeping atmospheric pollution under control. The reintroduction of climax species from other parcels of the rain forest, now extinct in the Cubatão region, should be undertaken as soon as pollution levels permit.





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Seminar on Environmental Issues in Brazilian Society

June 26-July 31, 1994

Project Report

Nancy Mandlove
Wofford College
Spartanburg, South Carolina

The project I submitted with my application to the Seminar consisted of both long-term and immediate goals. I am happy to report substantial progress on the immediate curricular goals of the project which were:

1. *the integration of the study of Brazil into two core courses for a new joint Latin American and Caribbean Studies program between Wofford and Converse Colleges*

2. *the development of an interdisciplinary course focused specifically on Brazil and its role in the Americas*

3. *establishing contacts in Brazil for the future development of student/faculty study and research in Brazil*

4. *to collect materials to develop lectures/presentations on Brazil (cultural and environmental issues) for college and community presentations.*

Progress report on goals

1. We are currently teaching the first of the two Seminars on the Americas which form the core of our new joint Latin American and Caribbean Studies program. The two syllabi for the courses being offered fall and spring, 1994-95 (attached to this report) indicate the degree to which the study of Brazil has been integrated into the program. Twenty-three faculty members from the two colleges are participating in the teaching of these seminars and part of the project has been to make available to them materials and information acquired during the seminar in Brazil so that they can incorporate that into their presentations. In the fall semester of the seminar, nine out of twenty-two teaching sessions (excluding exams and summary/review sessions) focus significant attention on

Brazil. That represents approximately 40% of the class/lab periods. In the spring semester, which is still not completely developed, Brazil is represented in about the same proportion (eight out of twenty-one class periods). Each student is required to pursue a research project for the seminar. This fall, approximately 40% of the projects focus on Brazil. Students are also divided into teams which report regularly on news from various regions of Latin America and the Caribbean. One group has been assigned to Brazil and reports weekly on items of interest in the news--most recently, the news about Brazil's elections. An additional benefit of participation in the Brazil Seminar is the contact and friendships one makes with other participants. We are fortunate this semester to be able to invite Dr. Emilio Rodríguez (a participant from Mount St. Mary's College in Maryland) to spend a day on campus with us and give a presentation to the Latin American Studies Seminar.

2. I have collected the resources and information to prepare a course on Brazilian culture for the Wofford Interim program (January term) next year (1996). The Interim program offers the opportunity to develop and teach new courses without the long delay required by Curriculum Committee procedures for courses in the regular college curriculum. New courses presented during the Interim can then be revised and incorporated into the regular offerings.

3. Through the summer Seminar, I have made many contacts that would allow us to arrange a student/faculty study group trip to Brazil in the future. We are currently holding planning meetings between the Latin American Studies faculty and the biology faculty to determine the feasibility of expanding the Latin American Studies program to include a second track: Neo-tropical Studies. We are discussing the possibility of a short-term program in either Manaus and nearby locations or the Pantanal region.

4. In addition to the many pamphlets, informational booklets and maps collected during the summer Seminar, I returned from Brazil with approximately 800 slides, numerous films and videos, tapes and compact disks, books and lists of books and materials which can be acquired here. The staff at the museums in Sao Paulo and Rio were particularly helpful in locating film and video sources. I have given one public presentation on Brazil this fall and will give several more during this school year.

Additional Projects

At Wofford College, we now have the technical resources to develop multi-media projects which can then be put into a CD Rom format. This will allow us to combine slides, music, video clips, photographs and text into units which can be used in class or used by students individually in the computer labs. Creating such programs requires considerable time and I will not be able to work on it while school is in session, but I plan to create such a unit on Brazilian culture--incorporating many of the resources acquired during the seminar. It will be an excellent way to make those materials available to many people in a compact and coherent form.

I would like to thank everyone who made the Fulbright Seminar in Brazil possible. It was a truly amazing experience in every way and I am very grateful to have had the opportunity to learn so much and to meet so many wonderful people.

Latin American and Caribbean Studies

Seminar on the Americas I

Fall, 1994

An interdisciplinary seminar focusing on the historical, political, social, and cultural inter-relationships of the nations in our hemisphere. Semester I concentrates on the historical and cultural foundations of Latin America and the Caribbean and explores the topics of race and identity, rural and urban life, authoritarianism and democracy, and national development.

The seminar on the Americas is designed to help students

- increase knowledge and understanding of the nations of Latin America and the Caribbean
- become aware of the long-standing economic, political, social and cultural ties that link the United States with the other nations of the Americas
- gain insight into the future of the nations of the Americas and the impact they will have on this country in coming years

Instructors: Dr. Nancy Mandlove *Spanish and Latin American Studies*
Dr. Susan Griswold *Spanish and Latin American Studies*

Guest presenters: Mayor James Talley *Spartanburg, South Carolina;* Dr. Brant Bynum, *Spanish,*; Dr. Anthony Scavillo, *French;* Dr. Jeffrey Willis, *History;* Dr. Jeri King, *French;* Dr. Tracy Revels, *History;* Dr. Caroline Cunningham, *French;* Dr. Rafael Hernández, *Spanish;* Dr. Cathy West *French;* Dr. James Proctor, *Finance;* Dr. Woodrow Hughes, *Economics;* Dr. Robert Powell, *Biology;* Dr. George Shiflet, *Biology;* Dr. Frank Machovec, *Economics;* Dr. Madelyn Young, *Economics;* Dr. Emilio Rodriguez, *Political Science, Mount St. Mary's College, Participant in 1994 Fulbright Seminar in Brazil;* Dr. Clarence Abercrombie, *Sociology;* Dr. Suzanne Schuweiler Daab, *Art History;* Dr. Gerald Thurmond, *Sociology*

Texts: Thomas E. Skidmore & Peter H. Smith, Modern Latin America, 3rd ed. (NY: Oxford Univ. Press, 1992)
Mark B. Rosenberg et al., Americas: An Anthology, (NY: Oxford Univ. Press, 1992).
Americas videos (#1,2,3,4)
Peter Winn, Americas: The Changing Face of Latin America and the Caribbean, (NY: Pantheon Books, 1992).
Alejo Carpentier, The Kingdom of This World, trans. Harriet de Onis (NY: The Noonday Press, 1989)
Gabriel García Márquez, One Hundred Years of Solitude,
Selected articles

Class: Class meets on Tuesdays and Thursdays 2:30 to 3:50
Laboratory sessions Tuesdays and Thursdays 4:00 to 5:30

Topics, Activities and Assignments:

9/13 *Introduction*

·Class: "The Sights and Sounds of Latin America" (Multi-media presentation-Olin Theater)

Lab: Simulation game-Barnga-exploring cultural differences

Brazil:

"The Sights and Sounds of Latin America" introduces the seminar with simultaneous projection of paired slides, coordinated with music and shown on the large screen available in Wofford's new Olin Theater. The visual images were chosen to represent the diversity of cultures, geographical features, social classes and daily life of Latin America. Brazilian images include: the Amazon, the Pantanal, Salvador, Curitiba, Rio, Iguasu Falls, Carajás, and Brasilia. Musical selections from Brazil include: contemporary samba, traditional folk music and cuts from "Copa, '94".

9/15 *Stereotypes*

Class: Discussion of commonly held stereotypes of Latin America and of stereotypes Latin Americans frequently have of the United States
Map exercise

Lab: Film,"*At Play in the Fields of the Lord*"

Assignment: Modern Latin America, 3-13
Winn, Americas, Preface, Chap. 1
100 Years, 1-37

Brazil:

The film deals with missionaries in the Brazilian Amazon. It exposes stereotypical views of indigenous peoples and cultures and it focuses attention on many of the important issues to be discussed throughout this seminar: cultural conflict and misunderstanding, conservation of the rain forest and the place of indigenous peoples, issues of development, differing world views and religious traditions.

9/20 ***Race and Identity***

Class: Defining race in the U.S. and in Latin America
Emphasis on racial identity in Bolivia, the Dominican Republic and ***Brazil***

Lab: *Américas video #6, Mirrors of the Heart (Bolivia and the Dominican Republic)*

Assignment Modern Latin America, 185-87; 403-4
Americas Anthology, 137-72
"Signs, Songs, Memory in the Andes," 9-13

9/22 ***Race and Identity***

Class and Lab: Library Orientation. Introduction to use of library resources, including access to CD rom databases, electronic searches, internet resources to be used for student research papers and class regional news reports.

Assignment: Modern Latin America, 290-94; 295-97; 308-11
Rosario Castellanos, "The Luck of Teodoro..."
100 Years, 38-81

Brazil:

Each student will pursue a research project and present results to the class (written and oral). Projects pertaining to Brazil this semester include: Women in Brazil, Population and the Growth of Cities in Brazil, Technology and Development in Brazil.

9/27 ***Race and Identity***

Class: Race and cultural identity. Understanding our own community
Mayor James Talley, Spartanburg, SC

Lab: Documentary, *"Family Across the Sea"*

Assignment: Essay topic and outline due

9/29 ***American Roots***

Class: Indigenous culture and world view
Focus on Aztec, Maya, and Inca civilizations

Lab: Documentary, "Central America: The Burden of Time"

Assignment: Americas Anthology, 17-27
A. Monterroso, "The Eclipse"
100 Years, 82-123

10/4 ***American Roots***

Class: Panel Discussion--Professors Bynum, Scavillo, Willis
Europe in 1492: Background of the Encounter
Spain, **Portugal**, France, and England

Lab: Demonstration and experiments: 16th century navigational instruments
Professor King
Discussion and comparison: Spanish and **Portuguese** navigators

Assignment: Daniel Boorstin, "The Discoverers"
Leonard,"Cultural Determinants in the Two Americas"

10/6 ***American Roots***

Class: The Collision: Europeans and the Other
Miskito legend

Lab: Film, *"Cabeza de Vaca"*

Assignment: *Modern Latin America*, 14-27
100 Years, 124-64

10/11 ***American Roots***

Class: History I: Conquest and Colonial Period
Professor Revels

Lab: Africa in the Americas (Professor Cunningham)
Film, *"Quilombo" and discussion*

Assignment: *Americas Anthology*, 28-38 (includes discussion of the **engenho** or **Brazilian** sugar plantation)
Mannix, *Black Cargoes*, Chap. 3, "The Early American Trade"
Essay bibliography due

Brazil:

General history lecture on conquest and colonization, with emphasis on the slave trade and the African presence in the development of several regions of Latin America and the Caribbean. Laboratory session focuses specifically on the African presence in Brazil. Carlos Diegues' film, "*Quilombo*," weaves together historical and contemporary features of African and Afro-Brazilian cultures.

10/13 ***Migration and Urbanization***

Class: The Latin American City: Tradition and Change
Professor Hernández

Lab: Documentary, *"The Struggle for Shelter"*
Brazilian short film, *"Ilha das Flores"*

Assignment: *"Urban Poverty and Politics in Rio de Janiero,"* MLA, Ch. 5
100 Years, 165-207

Brazil:

Lecture focuses on the historical development of the Latin American city and rural migration in the twentieth century. Discussion focuses on Mexico City, Quito, Sao Paulo and Rio, with materials, stories and examples taken from *Varal de Lembranças: Historias da Rocinha* (Uniao Pró-Melhoramentos dos Moradores da Rocinha, 1983). Includes slides taken in Rocinha during Brazil seminar. Lab includes a short film (a social commentary on urban social classes), "*Ilha das Flores*," acquired in Sao Paolo during the seminar.

10/18 ***Migration and Urbanization***

Class: Focus on Haiti and Cuba today
Professor West

Lab: Regional news reports
Review and discussion

10/20 ***Midterm Examination***

10/25 ***Migration and Urbanization***

Class: North American Free Trade Agreement
General Agreement on Tariff and Trade
Professors Proctor and Hughes

Lab: *Americas video # 3: Continent on the Move* (Focus on Mexico)

Assignment: *Americas Anthology*, 111-36

10/27 ***Geography***

Class: Geographical features of the Americas
Land and People
Professor Powell

Lab: Maps, geography, geology

Assignment: selected articles (to be determined)
100 Years, 208-49

11/1 ***Geography***

Class and Lab The nature of the rain forest
The environment
Flora and fauna
The coral reefs
Professor Shiflet

Assignment: Hern, "Family Planning Amazon Style"
Bornstein, "Too Many People
Teegardin, "Equality is Best Contraceptive"
Tucker, "Five Hundred Years of Tropical Forest Exploitation"
Prance, "Rainforested Regions of Latin America"
Janzen, "On Conserving Costa Rica's Tropical Forests"
Forsyth & Miyata, "Bugs and Drugs"

Brazil:

Geography section of the course focuses heavily on Brazil and includes material on the Amazon, the Pantanal and the Mata Atlantica. The two biologists presenting material in this section will use materials acquired during the Brazil seminar: maps, pamphlets, statistics and other resources, as well as slides taken of these regions during the trip.

11/3 ***Authoritarianism and Democratization***

Class: Economic development and political underdevelopment
Professors Machovec and Young

Lab: Documentary, "*South America: Dictators or Democracy?*"

Assignment: *Modern Latin America*, 56-59; 59-62; 66-67
and Chap. 5 (144-84) **"Brazil: Development for Whom?"**
100 Years, 250-97

***Brazil*:**

Readings for this class period focus on Brazilian history from Dom Pedro I (1822-1831) to the election of Fernando Collor de Mello in 1989.

11/8 ***Authoritarianism and Democratization***

Class: Guest lecturer, Dr. Emilio Rodriguez, Political Science, Mount St. Mary's College
Participant in 1994 Fulbright Seminar in **Brazil**

Lab: Computer simulation game, "*Castellón*" (focusing on the complex inter-relationships of democratic and authoritarian forces in Latin America)--developed and published by Dr. Emilio Rodriguez.

Assignment: *Americas Anthology*, 72-103
Americas video # 2, "Capital Sins" (**Brazil**)

Brazil:

Readings and video focus almost entirely on Brazil, including the years of the military government, the return to democracy and popular political movements of recent years.

11/10 ***Legacies of Empire***

Class: The Mexican Revolution (Role play)

Lab: New World Utopias
Professor King

Assignment: *Modern Latin America*, 27-42
Preparation for role play
Voltaire, *Candide*, Chaps. 16, 17, 18 (El Dorado)
100 Years, 298-338

11/15 ***Legacies of Empire***

Class: History II--Independence and the Nineteenth Century
Professors Abercrombie and Revels

Lab: The Mexican Muralists
Professor Schuweiler Daab

Assignment: *Americas Anthology*, 38-47
Draft Essay Due

11/17 ***Legacies of Empire***

Class: The Haitian Revolution
Professor Cunningham

Lab: News Reports
Haiti Now

Assignment: Alejo Carpentier, The Kingdom of This World
100 Years, 339-381

11/22 ***Dilemmas of National Development***

Class: Caudillismo and Caciquismo
Professor Hernández

Lab: Film, *"La deuda interna"*

Assignment: Modern Latin America, 43-56; 68-111
Americas video #1, "The Garden of Forking Paths" (Argentina)

11/24 ***Thanksgiving***

11/29 ***Dilemmas of National Development***

Class: Militarism in Latin America
Professor Gerald Thurmond

Lab: Film, *"La historia oficial"* Part I (Argentina)

Assignment: Americas Anthology, 48-71
Rial, "The Armed Forces and the Question of Democracy in Latin America"
Millett, "The Central American Militaries"
Zagorski, "A New Era in Latin American Civil-Military Relations"

12/1 ***Dilemmas of National Development***

Class: Regional News Reports
Film, *"La historia oficial"* Part II

Lab: Review discussion

Assignment: Liliana Heker, "The Stolen Party"
100 Years, 382-422

12/6 ***Conclusions***

Class: Discussion of García Márquez, One Hundred Years of Solitude

Lab: Documentary, *"Márquez: Tales Beyond Solitude"*

Assignment: Final Essay Due

12/8 *Conclusions*

Class: Regional News Reports
Documentary, "*Gabo*" (Gárcia Márquez and the Nobel Prize)

Lab: Evaluations

Assignment: Americas Anthology, 265-69 (Gárcia Márquez Nobel acceptance speech)

Course evaluation:

1. *News Group Reports*	10%
2. *Research Essay*	25%
3. *Reading, One Hundred Years*	15%
4. *Midterm Exam*	25%
5. *Final Exam*	25%

Latin American and Caribbean Studies
Seminar on the Americas II
Spring, 1995

An interdisciplinary seminar focusing on the historical, political, social, and cultural inter-relationships of the nations in our hemisphere. Semester II concentrates on Latin American and Caribbean cultural identity, the changing role of women, revolution, problems of sovereignty, and the Latin American and Caribbean presence in the United States.

The seminar on the Americas is designed to help students

- increase knowledge and understanding of the nations of Latin America and the Caribbean
- become aware of the long-standing economic, political, social and cultural ties that link the United States with the other nations of the Americas
- gain insight into the future of the nations of the Americas and the impact they will have on this country in coming years.

Instructors: Dr. Nancy Mandlove *Spanish and Latin American Studies*
Dr. Susan Griswold *Spanish and Latin American Studies*

Guest presenters: Dr. Robert Powell, *Biology;* Dr. George Shiflet, *Biology;* Dr. Cathy West, *French;* Dr. Rafael Hernández, *Spanish;* Dr. James Barrett, *Religion;* Dr. Gerald Thurmond, *Sociology;* Dr. Frank Machovec, *Economics;* Dr. Caroline Cunningham, *French;* Dr. Brant Bynum, *Spanish;* Ms. Gayla Jamison, *Independent film maker, Atlanta;* Ms. Jill Ruhlman, *Artist, Atlanta.*

Texts: Thomas E. Skidmore & Peter H. Smith, **Modern Latin America**, 3rd ed. (NY: Oxford Univ. Press, 1992)
Mark B. Rosenberg et al., **Americas: An Anthology**, (NY: Oxford Univ. Press, 1992)
Americas videos (#)
Peter Winn, **Americas: The Changing Face of Latin America and the Caribbean**, (NY: Pantheon Books, 1992).
Isabel Allende, *The House of the Spirits*
Selected articles

Class: Class meets on Tuesdays and Thursdays 2:30 to 3:50
Laboratory sessions Tuesdays and Thursdays 4:00 to 5:30

(Syllabus not yet completely developed.)

Topics, Activities and Assignments

2/14 **Introductory class**

Class: Carnival (Multi-media presentation-Olin Theater)

Lab: Film, "*Black Orpheus*"

Brazil:

The opening class period roughly coincides with Carnival, which serves as a focus for the multi-media presentation which consists of slides, video clips and music from Carnival celebrations in Latin America and the Caribbean--with special emphasis on Brazil. The lab session is devoted to the Brazilian film, "Black Orpheus."

2/16 ***Geography***

Class and Lab: Land and people of the Pantanal (**Brazil**) and the Llanos (Venezuela)
Professor Clarence Abercrombie (Wildlife Research, Florida State University)

Brazil:

Slides and other materials collected during the Brazil seminar will be used in this presentation.

2/21 ***Geography***

Class and Lab: Land and people of Costa Rica and the Dominican Republic
Professor George Shiflet

2/23 ***The Changing Roles of Women***

Class: Guest lecturer, Gayla Jamison, documentary film maker (Chile, "Scraps of Life")
Focus on women in Chile during the Pinochet years

Lab: *Americas video #7, "In Women's Hands"*

Assignment: Modern Latin America, 62-66; 122-43
Ariel Dorfman, Death and the Maiden

2/28 ***The Changing Role of Women***

Class: Women and the "informal economy" in Latin America
Professor James Proctor

Lab: Documentary, *"Microcredit"*

Assignment: Winn, Americas, Chap 9
Americas Anthology, 173-297 (**Brazil**-includes, Carolina Maria de Jesus, "Life in the Favela")

3/2 ***Changing Roles of Women***

Class: Women in the Caribbean
Professor West

Lab: Film, *"Hasta cierto punto"* (Cuba)

Assignment: (To be determined)

3/7 ***Continuity and Change In Religion***

Class: Panel Discussion--The Church Divided
Professors Barrett, Griffin, Hernández, Thurmond

Lab: Film, "*Romero*"

Assignment: Modern Latin America, 326-30; 332-37
Americas video #8, "Miracles Are Not Enough"

Brazil:

Panel discussion will focus on a broad range of church and religious issues in Latin America and will include discussion of liberation theology and the work of Leonardo Boff, Christian base communities, spiritism, and Pentecostalism in Brazil. The *Americas video* assigned for this class period deals in large part with Brazil.

3/9 ***Continuity and Change in Religion***

Class: Latin American Religious Traditions
Indigenous and African roots

Lab: Film, "The Mission"

Assignment: Americas Anthology, 208-40
Ariel Dorfman, "The Warning Signs"

Brazil:

Class discussion, reading assignment (*Americas Anthology*), and the film ("The Mission") all focus on Brazilian religious traditions, the role of religion in daily life, syncretism, parallel religious practices and religious conflict.

3/14 ***Continuity and Change in Religion***

Class: Native American guest speaker (to be determined)

Lab: Documentary--Bill Moyers, "God and Politics: A Kingdom Divided"

Assignment: Winn, Americas, chap. 10, "The Power and the Glory"

Brazil:

Much of the reading assignment from Winn, Americas, focuses on Brazil.

3/16 ***Latin American Cultural Identity***

Class: Latin American Folk Art--Vision and Expression of the People

Lab: Video, "*Ruben Blades*"

Assignment: *Modern Latin America*, 301-03
Americas video #9, "Builders of Images"

Brazil:

Folk art presentation will include masks and costumes of the Brazilian Amazon region and artifacts reflecting the African heritage in Brazil. The *Americas video* includes an important segment on Brazilian music.

3/21 *Latin American Cultural Identity*

Class: Student presentations on music
Bossa Nova, Samba, Reggae, Salsa, Merengue, etc.

Lab: Film, *"Rockers"*

Assignment: Americas Anthology, 241-71

Brazil:

Considerable time is devoted to Brazilian music in this class/lab session.

3/23 *Latin American Cultural Identity*

Class: Popular Theater in Latin America (focus on Nicaragua)

Lab: Art in Latin America
Professor Schuweiler-Daab

Assignment: Winn, Americas, chap. 11, "The Magical and the Real"

Brazil:

Much of the chapter in the reading assignment is devoted to Brazilian music and includes discussion of Olodum, Caetano Veloso, Tropicalism, bossa nova, and Gilberto Gil. Examples of this music will be played in class (from CD's acquired during the Brazil seminar). Students also have access to an extensive collection of Brazilian music in the Wofford College language laboratory.

3/28 *Problems of Sovereignty*

Class: Economic Dependence
Professors Hughes and Machovec

Lab: Documentary, *"Panama Deception"* (part I)

Assignment: Modern Latin America, 298-301; 321-24; 374-75
Americas video # 10, "Get Up, Stand Up" (focus on Jamaica and Colombia)

3/30 *Problems of Sovereignty*

Class: The Drug War
"Panama Deception," (part II)

Lab: Documentary, *"The World Is Watching"*

Assignment: Article on Drug War
Winn, Americas, chap. 12, "Endangered States"
Americas Anthology, 272-98

Spring Break

4/11 ***Problems of Sovereignty***

Class: U.S. Intervention in Latin America

Lab: Simulation game, "Intervention Rodeo"

Assignment: Essay by Audre Lorde on Grenada
Garcia Márquez, Autumn of the Patriarch, (excerpt on sale of the Caribbean)

4/13 ***Revolutions and Revolutionaries***

Class: Simulation game, "The Game of Life"

Lab: Documentary, "*Fire from the Mountain*"

Assignment: *Americas video # 11, "Fire in the Mind,"* (focus on El Salvador and Peru)
Americas Anthology, 299-334

4/18 ***Revolutions and Revolutionaries***

Class: Revolution and Counter-Revolution in Central America

Lab: Stories from El Salvador--Salvador Media Project Videos

Assignment: Manlio Argueta, One Day At a Time

4/20 ***Revolutions and Revolutionaries***

Class: Peru and El Sendero Luminoso

Lab: Video, "*La boca del lobo*"

Assignment: Winn, Americas, chap. 13, "Making Revolution"
Poems: Claribel Alegria and Ernesto Cardenal

4/25 ***Revolutions and Revolutionaries***

Class: Pablo Neruda and Latin America

Lab: Film, "*One Hundred Children Waiting for a Train*"

Assignment: poetry of Pablo Neruda
excerpts of Neruda's memoirs

4/27 ***The Latin American and Caribbean Presence in the United States***

Class: Overview

Lab: *Anericas video #12, "The Americans"*

Assignment: Modern Latin America, 378-81
Americas Anthology, 335-72

5/2 **The Latin American and Caribbean Presence in the United States**

Class: To be determined

Lab: Film, *"Stand and Deliver"*

Assignment: Winn, Americas, chap. 14, "North of the Border"
Rudolfo Anaya, "The Village the Town Painted Yellow"

5/4 **Conclusions and Reports**

5/9 **Conclusions and Reports**

ONE MAN, ONE CITY, PROBLEMS AND SOLUTIONS:

Jaime Lerner and The Curitiba Program for the Environment

Fulbright - Hays Summer Seminar Project - 1994

David McCullough Ph.D.
Professor of History and Sociology
West Shore Community College
Scottville, Michigan

ONE MAN, ONE CITY, PROBLEMS AND SOLUTIONS: JAIME LERNER AND THE CURITIBA PROGRAM FOR THE ENVIRONMENT

The Problems:

As Megacities have so rapidly developed in areas that once contained small third world colonial towns, environmentalists around the world have turned their focus toward those environmental concerns they have labeled "brown issues": air pollution, poor sanitation, and water pollution. The temptation to despair over the future of life in these cities is exacerbated by the realization that the megacities of the long-industrialized areas of Europe and North America have accomplished little in the way of addressing these same tough issues.

Initially the leaders of growing third world cities viewed growth as a positive good...a source of pride. Not too long ago, leaders of Brazil's explosively expanding industrial city of Sao Paulo bragged "Sao Paulo Nao Pode Parar"... Sao Paulo cannot stop. Urban Sprawl was filling up the spaces along the Sao Paulo - Rio De Janeiro Highway. This kind of decentralized growth created greater dependency on automobiles. By the end of the last decade there were more cars than telephones in Sao Paulo, with a concomitant increase in "brown" air. An American reporter recently observed that the city's new slogan is "Sao Paulo tem de parar!...Sao Paulo must stop!" Antiquated zoning laws are viewed as part of the problem. City plans continue to follow the pattern of segregation by use. Factories, shops and other places where work is concentrated are usually separated from places where the workers actually live causing an unfortunate reliance on private automobiles at worst, and the overcrowding of inadequate, poorly planned and hugely expensive systems of mass transportation at best.

Marcia Lowe, writing in "World Watch" notes that "A more rational approach to zoning in both developing and industrial world cities would be to integrate homes not only with work places but with commercial, recreational, and other land uses so they are easily accessible without cars."

Planning for more integrated, compact communities on paths of expansion would surely be a wise choice, and should be encouraged or even mandated. But, in the older centers of the growing cities, it would in many cases be impractical. The best solution in these long-existing central city areas would be a highly efficient system of inexpensive public transportation capable of carrying large numbers of riders to a wide range of destinations in the shortest possible time.

Sanitation, the second of the "brown issues," is a complex and perplexing problem in large cities with little revenue and significant populations of ill-housed poor. This is especially true in the poor settlements within cities where dwellings are constructed along lanes that have not yet been planned, or even named by city administrations. Examples of such settlements are the barrios of the poor nestled around Mexico City, or the favelas in the large cities of Brazil. Even if such growth had an element of planning, that planning would most likely not include much consideration for adequate waste disposal. Of course, one approach to the sanitation problem would be a program aimed at maximum recycling of disposables. In order to be effective it would have to be popularly accepted. To gain acceptance there would have to be a mass education program and a system of rewards sufficient to reinforce the newly learned behaviors.

Fortunately models exist for an inexpense and efficient mass transit system and a popular and effective recycling program. The best of each, according to the thinking of many environmentalists, are to be found in one city. The city is Curitiba (pronounced cur-uh-chee'-buh), the capital of Brazil's state of Parana'. Curitiba is a city that is palpably aware of its place on the leading edge of the environmental awareness curve. As much as any large and successful movement can be credited to the creative mind, drive, and charismatic leadership of one man, the "Curitiba miracle" is the work of the city's three-time mayor Jaime Lerner.

The Man:

Curitiba began the rapid expansion so typical of many third world cities in the 1950s. It grew from 150,000 in the 1950s to well over a half million by the mid 1960s. It was during this period of early growth that a small group of young planners, engineers and architects approached their mayor, Ivo Arzura, an engineer himself, with their concerns that Curitiba would soon lose its green areas and follow the same chaotic growth pattern as Sao Paulo.

Mayor Arzura shared those concerns. He sponsored a national contest to acquire the best ideas available. The young planners, led by architect Jaime Lerner, worked those ideas into a new master plan. The plan gained widespread popular support as it was presented and debated, and sometimes modified, in a series of public meetings in the city's diverse neighborhoods. After approval, the Curitiba Institute for Research and Urban Planning (IPPUC) was organized to work out the details of implementation.

Lerner was always among the most creative of the IPPUC Group. By 1971, the military junta then ruling Brazil had the rare good sense to name Lerner mayor of Curitiba. From that office, Lerner had the kind of voice and power to gain the adoption of the IPPUC's continuing output.

Unlike many of the military appointees, Lerner has always enjoyed widespread popular support. During the junta, Lerner served two separate terms as mayor. (Brazil does not allow consecutive terms.) After Brazil's return to democracy, Lerner decided only twelve days before the 1988 municipal elections to try for a third term. He chose to run as the candidate of the newly enfranchised leftist Democratic Labor Party. He was easily elected. Attesting to his nearly universal popularity is the fact that he is one of only a few big city mayors in the world that can safely walk the streets of his city...and be deluged with autograph seekers!

Today, Curitiba's population is over 2 million. It is a city that boasts of clean streets, many of which are lined with yellow or purple flowered Ipe Trees. There are parks throughout the city where "Curitibanos" can enjoy zoos, trees and the clean water of their lakes and streams. Environmentalists from around the world seem to agree that the credit for Curitiba's success must go to Jaime Lerner.

Lerner's appearance provides nothing to the casual observer to suggest that here is an important, popular and politically powerful man. Far from meeting the role expectations of a South American "Caudillo", this son of Polish immigrants always appears to be having the best of times, frequently breaking out into an infectious grin, and is almost never seen in a suit and tie. His daily routine as mayor took him first to a secluded office within the city's municipal environmental department. There, surrounded by members of his environmental IPPUC "Brain Trust" and its current and long-time leader Cassio Tanaguchi, Lerner would do what he likes best. He would kick around ideas to keep Curitiba the "greenest" city that it could be.

Lerner's drive to build a better environment is driven by a real concern for today's children. He has declared that "the strategic vision of the country leads us to put the first priorities on the child and the environment. For there is no deeper feeling of solidarity than that of dealing with the citizen of tomorrow, the child, and the environment in which it is going to live."

While admitting that big cities face enormously complex problems, he insists that planners must not allow themselves to be overwhelmed. He believes that "We have to get away from the syndrome of tradgedy". Lerner cites Rene Dubo's dictum that "Tendency is not destiny". It is Lerner's belief that in order to make citizens believe solutions to their problems will work you must form partnerships with them. He notes that his schemes for tree planting and garbage recycling have worked because citizens were involved in the beginning, and that "the dream of a better city is always in the heads of its residents."

Lerner's approaches to big city problems are always driven by a sense of reality. City administrators, he believes, must be able to locate the balance line between necessity and possibility. Also, they have to think pragmatically about both today and the future. "The mayor who tends only to current necessities forfeits the city of tomorrow, while the mere visionary stumbles over the potholes of the present."

An overarching element of Lerner's pragmatism is that city administrations must think "small and cheap." Grandiose plans that will run up against a wall of dwindling resources are wrong-headed. He thinks that the cities of tomorrow "will look a lot like the cities of today." While Lerner's Curitiba was working out solutions to today's and tomorrow's problems back in the 1950s and 1960s, the federal government's urban planners were developing one of the worst models in the nation's new built-from-the-ground-up capital of Brasilia. Brasilia is a city planned around the widespread use of private automobiles. No city planner with the chance to plan a brand new city today would make the same foolish mistake. In order to compound their folly, Brasilia is presently building the first part of an expensive subway system. Why? Because the federal city wants to be equal to Brazil's major cities of Rio De Janeiro and Sao Paulo. It needs to have the false prestige acquired by wasting time and space to build an outrageously expensive and inefficient subway system. A system that will assure the continued decentralization of the city. This kind of anti-environmental effort is all the more unbelievable given the knowledge that right close by is Curitiba's low-cost, highly efficient alternative to an expensive subway system. The Curitiba bus system rivals the carrying capacity and speed of subway systems, and it does so at an initial cost of only a small fraction of a subway's construction cost. Of all of Lerner's many "small and cheap" concepts, this is the one that has created the most interest and emulation around the world.

Mass Transit

Urbanization is a fact of life in developing nations. As the poor move into cities, they are forced by economic factors to concentrate on the periphery of the cities, often out of the reach of systems of mass transit. Those fortunate enough to find themselves another rung or two up the socioeconomic ladder can locate within reach of centers where the better jobs are located. This geographic advantage often is associated with the added advantage of getting additional family members into gainful employment. To the extent that cities can provide access to jobs they can also prevent that maldistribution of wealth that keeps some of their citizens trapped in poverty.

Curitiba, and Lerner employed their typical "small and cheap" pragmatic reasoning to this problem and came up with a uniquely innovative design. Not monorails, not subways, but buses! However, Curitiba's bus system is designed to take advantage of those components of a big city subway that can be adapted to their network.

Of course, the hub of the system is the city's center. Out from this hub radiate a network of five high speed lines called structural axes. Buses move along the axes in their own lanes, "Canaletas", made impregnable by guard rails. At peak commuter periods the buses run at twenty second intervals. The first axis to be completed initially carried 20,000 passengers. Its efficiency led to popularity, and it rapidly gained over 50,000 loyal passengers.

These main lines run approximately ten kilometers out from the hub. At regular intervals the structural axes intersect a series of local lines called "interbairros" which form ever-expanding rings around the city center. There are 185 kilometers of these interbairros which, in turn, receive passengers from 300 kilometers of "feeder" routes. Care was given to build, or encourage the building of specialized commercial centers along the structure's routes. IPPUC director Tanaguchi believes that the basic design of the system, and its special adaptations to the people and neighborhoods that it serves, will allow its expansion to a carrying capacity of two million daily passengers. The design of the corridors provides for the possibility of a conversion to light rail or high capacity rapid rail. But for now, Curitibanos are delighted with this "user friendly" bus system that acts like a subway.

This bus system is like a subway in its carrying capacity, its fare collection, boarding and exiting systems, and in its speed. The system is currently capable of carrying as many a 23,000 riders per hour, a capacity equal to Rio De Janeiro's subway. Rio has a population approximately five times that of Curitiba. Carrying capacity is also enhanced by specially designed three-unit hinged or articulated buses capable of carrying 270 to 300 passengers.

Passenger handling is managed in specially constructed "tube stations": 33 feet long, 9 feet high stainless steel, acrylic, and hardened glass mini-depots. Passengers purchase tickets and transfers, and wait in dry, well ventilated, multi-seated comfort for their ride. The floor level of the cylindrical tubes is at the same level as that of the buses. As the bus arrives it moves into alignment with its exiting and entering doors parallel to those of the tube station. A button is pushed, all four doors open, a metal platform moves out to cover the open spaces, and passengers quickly enter and debark. This system has the capacity to handle eight people per second, rather than the best conventional bus standard of one person every four seconds. As fares are not taken on board, more space is available for passengers, and perhaps more importantly, no time is lost taking on-board fares and fumbling for tokens or change. The bus-only lanes and the quick embarkation/debarkation method has provided the Curibitanos with their nickname for the transit system, "the ligeirinho" (the swift one).

The popularity of the "ligeirinho" has done much to prevent air pollution. Curitiba has 500,000 cars, a higher per capita car ownership than any other Brazilian City. Yet thirty percent of the car owners elect to take the bus. Ridership has risen to the point that the use of auto fuel is less per capita than any other Brazilian city. Half of Curitiba's total population rides the bus network daily.

The system requires no government subsidy. And its efficiency allows low fares. Twenty cents will take a rider anyplace in the system. Both the initial cost and the continuing operations cost are much lower than comparable subway systems. Lerner has said that "the system transports 1.3 million people a day. That's four times as many as Rio De Janeiro's subway carries, and our system costs a hundred times less." World Bank Estimates indicate that Curitiba's costs to develop the system of $200,000 per kilometer are considerably below the average subway development cost of approximately $100 million per kilometer.

The separated cost of the more expensive articulated bus routes is about 1.3 million, still well below subway construction costs.

Costs are further reduced by Curitiba's privatization of the system's operation and maintenance functions. A plan was developed to pay successful bidders according to the number of kilometers covered and passengers carried. The city guarantees the independent operators a set percentage of the fare price. The balance is kept by the city and used to construct and maintain roads and terminals, replacing buses, and managing the system.

The awareness and popularity of Curitiba's bus system abroad has permitted Lerner to utilize his in-between-terms time to take consulting work around the world. He has helped develop improved surface transit systems in San Juan, Puerto Rico; Caracas, Venezuela; and Havana, Cuba. He has also consulted with the Chinese government. Even some first world cities have sought to emulate the Curitiba model. Vancouver, British Columbia, and Lyon, France have applied some of those principles. Perhaps the most significant of these imitations of the Curitiba model in the hearts of the Curitibanos was when they saw on their television sets a live demonstration of a Curitiba "Ligeirinho" bus on the streets of New York with Jaime Lerner on board.

Lerner has also capitalized on the bus system's popularity at home by using tokens for free rides on the buses in exchange for the cooperation of the poorest Curitibanos in his program to recycle just about everything.

Recycling

The second program that has drawn world-wide attention to Curitiba is Lerner's ambitious garbage and trash recycling effort. As with many such programs there was a major propaganda campaign to mobilize a constituency for recycling. A slogan was developed "lixe que nao lixe"...trash that isn't trash. Lerner preached recycling on television. "A city that does not recycle will not survive." He took the campaign into the schools with the help of volunteers dressed as trees. The need to recycle is mandated in the curriculum of the city's 110 schools. Children learn to make toys from recycled materials. Lerner's aim is to make recycling a major element in Curitiba's civic religion...concern for the future by being good stewards of the environment. The poor, even those outside the political boundaries of the city, are proselytized into the faith by rewards for bundling up and turning over their trash. Usually the rewards are the very desirable transit passes, but surplus foods such as eggs, milk, and produce, are also used as media for exchange. About fifty of the slum neighborhoods are involved with the "green exchange."

The program also involves people recycling. Teams of the city's unemployed are put to work in military style units with bright colored coverall uniforms to collect segregate, and process the trash. These units seem to appear out of thin air in the city's late evening hours. They go through some military drills, then wage war on the city's trash. Lerner is proud of these workers who he sees as integrating back into society. This pride seems to go full circle. The Curitibanos are also proud of the units and the unit members truly seem to be proud of themselves. When Curitibanos hear the bell of the green trash collection trucks, they set out their bundles of "trash that isn't trash" separated only into two categories...organic and inorganic. (Lerner understood that to make the homeowner's job of separation too directive and complex would be to doom the program.)

Recycled materials find many markets with local industry. Glass is purchased by a preserve company. Styrofoam is shredded and used in quilts given to the poor.

Over 100 tons of trash are recycled each day. This amounts to about two-thirds of all the city's trash. Lerner calculates that enough paper is recycled to save "six small forests" each day (about 1,200 trees). He claims that "if every city in Brazil would do the same, we would save 500 forests every day."

From the outset participation has been extremely high, quickly involving about seventy percent of the population. And all with completely voluntary cooperation. (In New York City an estimated ten to fifteen percent of households recycle.) There are no fines for non-compliance. At the mayor's meeting of the 1992 Rio Environmental Conference, Lerner announced that the recycling program was enjoying the cooperation of ninety percent of Curitiba's households. Lerner seems never to tire. He and the IPPUC staff have instituted an impressively expansive list of environmental projects.

OTHER PROJECTS:

Among the many socio-environmental innovations is one that converts old buses to mobile classrooms in order to take vocational education to those who are in the greatest need. The subjects taught range from plumbing to hairstyling.

Another effort aimed at alleviating the disparity between social classes is Lerner's public housing policy which mixes low and middle income households in a relatively successful effort to minimize ghettoization. Curitiba may be the only place where still - immaculate, twenty-year-old housing projects can be found.

A controversial socio-environmental program encourages businesses to "adopt" a number of street children and provide them with meals in exchange for errands, gardening and other light tasks. This program may technically be in violation of child labor laws, but Lerner excuses it by saying "by law a child mustn't work, but society looks the other way when he goes hungry, homeless, or works for a drug trafficker."

Yet another of Lerner's policies to ease the burdens of poverty and promote intracity linkage, is to help the city's itinerate street vendors in organizing regularly scheduled open air markets. These street fairs move from one poor neighborhood to another to provide shopping opportunities to residents who are unable to pay the higher prices of the city's established markets.

Lerner's plan to revitilize the center city by closing of some thoroughfares and turning them into pedestrian shopping malls met with much skepticism and disapproval. But, as with most of his plans, the completed malls gained instant popularity. Today, the first of those malls, the "Street of Flowers", is the most expensive area of the city. One of the later malls "24-hour Street" is a popular shopping, eating, and meeting place for the city's young.

To keep Curitiba Green, literally green, the city has developed some outstanding parks, all within a twenty minute bus ride from the Passeio Publico, the park that serves the relaxation and informal meeting needs of the city's center. There are two large parks on the city's north (200,000 and 1,000,000 square meters). A little closer to downtown, Barigui Park encloses 400,000 square meters. The huge 8,000,000 square meter Iguazu Regional Park holds the city's zoo with a thousand animals living in habitats that simulate their natural environment. Lamps in the city's parks, not surprisingly, are made from recycled Fanta soda bottles.

One of Lerner's personal favorites among the green programs is his arborization compaign. Curitibanos listened when their mayor, a famous urban architect, said, "there is little in the architecture of a city that is more beautifully designed than a tree." His slogan in this project is "we'll provide the shade, you pitch in with the water." In the past twenty years, one and a half million saplings have been planted. At times the city is ablaze with the yellow and purple flowers of its exotic Ipe Trees.

To be sure there are many social, economic, and even environmental problems in Curitiba as there are in all cities. However, Curitibanos have looked at the problems of today's megacities and they have realized that to follow failed policies will lead to failure. Their optimistic leadership has convinced them that "tendency is not destiny." They have shown unusual commitment to experimentation. The result has been the development of an impressive array of prototypes ready for adaptation to the particular requirements of cities of all sizes in both the industrialized and developing worlds.

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Measuring Quality of Life in Brazil

A
FULBRIGHT-HAYS CURRICULUM PROJECT

based on

Seminar on Environmental Issues in Brazilian Society
Summer 1994

submitted by Rachel A. Nugent, Ph.D
Department of Economics
Pacific Lutheran University
Tacoma, WA 98447

Measuring Quality of Life in Brazil

I Introduction

This project is presented as one component of a college-level introductory course in economics which applies economic principles to analyze environment and development issues globally. The students work in groups to investigate a broad range of economic, environmental, and social conditions in a chosen country, and represent these conditions using available published data. They prepare a group paper as well as a poster or other visual representation of their findings. After being a participant in the Fulbright Seminar on Environmental Issues in Brazilian Society during the Summer of 1994, I developed this project to make use of the information and ideas I had obtained in the Seminar. I used my Fall Principles of Economics class to try out the curriculum project.

The students in my Fall, 1994 class chose 12 different countries but used Brazil, and data collected from my Fulbright seminar experience as well as available library information, as their prototype for studying these countries. I was able to suggest ideas, sources of information, and areas of emphasis that may be applicable to the investigation of the other developing countries based on my Summer Fulbright experience in Brazil.

This report presents a description of the project objectives, the assignments used to develop the project (copies included), procedures and sources used by the students, background notes, evaluation of the results, and a copy of the final paper submitted by the students who studied Brazil. This project proved to be quite successful in meeting many of its goals and in encouraging students toward further study of economics and development. My experience in Brazil was extremely useful to the students both for actual information and interpretation of data, as well as for insights into the plethora of factors determining these conditions in Brazil.

II. Objectives of the Curriculum Project

The project includes both content and skill objectives and is intended as an active learning experience for students. It requires them to work in small groups, define and gather relevant data, interpret the data in a broad context, present it in written and visual form, and make a brief oral presentation in class. It is incorporated into a Principles of Economics class in which I place a special emphasis on environmental and development issues. Thus, students are already learning new tools of analysis and are expected to use this exercise to apply these tools to an actual country study. The content portion of the project is intended to be an extension of the "National Income Accounting" (NIA) component of the principles course, generally seen as a boring, but necessary, part of learning economics. The main purpose of NIA is to allow measurement of the macroeconomy, and derive Gross Domestic Product (GDP).

The usual goal of introducing principles students to National Income Accounts is to provide a common framework and vocabulary for assesing economic conditions and progress. Economists tend to focus on economic ways of measurement. They view a nation as an economy and generally pay much more attention to products and resources that are traded in markets than those that aren't. Aside from ignoring many activities that affect people economically, this narrow approach also ignores many other factors that affect "quality of life." The purpose of this curriculum project is to encourage students to develop a measure of "quality of life" for a country that encompasses economic, social, cultural and environmental factors. With a more inclusive definition of national well-being, this project can help students consider:

- Relationships between market and non-market activities
- The philosophical basis for defining "progress"
- Difficulties arising from choice of measurement techniques
- The non-objectivity of numbers
- The difference between a narrow economic approach and one that blends multiple perspectives

Specifically, the table below defines skills and content that students gain from this curriculum project.

Skills Developed	**Content Developed**
Data Collection (library, Fulbright material, other research)	Measurement of National Income
Data Interpretation	Other Economic Measures of Conditions
Collaborative Learning	Social Measures of Conditions
Analytical Writing	Environmental Measures of Conditions
Visual/Graphic Presentation of Data	Analysis of Relationships Among Indicators
	Comparisons Across Time and Countries

III. Procedures for Conducting the Curriculum Project

The topic of country income comparisons is discussed as a way of motivating the class to consider different aspects of quality of life. The standard economic approach to GDP accounting is presented, including a historical rationale of the development of national income accounts. The weaknesses and strengths of economic income accounting are discussed. Any beginning economics text contains a chapter on national income accounting and includes brief mention of the weaknesses of current measures. Such weaknesses include using monetary measures as indicators of welfare, excluding many productive activities not traded in marketplaces, excluding negative activities such as pollution and over-harvesting of natural resources, and ignoring distributional issues.

Once the students have made their way through the GDP accounting, the fun begins. The class as a whole discusses non-economic aspects of "quality of life," and develops a list of measurable potential categories to include. Useful to them at this point is one of the required texts: *Alternative Economic Indicators*, by Victor Anderson.[1] This book presents arguments for using a broad array of measures to assess a country's overall conditions. The advantage of this approach is that it allows for consideration of a broader range of indicators, avoids reliance on monetary measures that may be distorted, and can use readily available data for a wide variety of social, economic, and environmental indicators. Anderson suggests five categories and specific indicators within each category. The students are able to use this "cookbook" as a guide to their selection of and search for appropriate measures of country conditions.

A brief list is provided here of the readily available indicators in the five categories that Anderson (1991) recommends. They are not all equally available on a comparable basis across countries, but students are asked to consider the reliability and credibility of data sources as part of the exercise.

Social

Educational attainment or literacy rates, especially disaggregated by race and gender. As we learned in Brazil, the official literacy rate (75%) can be widely at variance with the literacy rate assessed by education professionals (25%).

Work and Unemployment

Unemployment rates disaggregated by race and gender are the easiest measure, but a measure of time spent at all types of work by gender would be more revealing. This, of course, is almost impossible to get even for developed countries.

Consumption

Simple measures of satisfaction of basic needs are not difficult to get. These would include calories as a percentage of minimum requirements, percent of people with access to clean drinking water, and sanitation. Others included as proxies of level of development include telephones per capita, square feet of living space per capita, etc.

Distribution of Income/Wealth

The standard measure is percent of income earned by the top 20 percent of the population divided by the percent of income earned by the bottom 20 percent. When possible this can be supplemented with some measure of wealth distribution.

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[1] Anderson, Victor, (1991), Alternative Economic Indicators, London: Routledge.

Health

The most revealing single measure is the infant mortality rate. This can be supplemented by the under-five mortality rate and the life expectancy at birth. Any of these disaggregated by race or income level would be particularly revealing

Environmental

There are many choices here, and the biggest problem presented with this category is the difficulty in comparing countries because of vastly different resource bases. However, students can select those most pertinent to individual countries. For Brazil, for instance, the deforestation rate, population growth rate, carbon dioxide emissions, and a measure of land degradation would be important.

Over the course of several months, the groups of students gather and interpret data, sharing their findings with the entire class in order to provide assistance to each other. These sharing and discussion sessions are organized in two ways to encourage interaction and dissemination of information. The students divide themselves into specialties by the category of information they are seeking: economic, social, or environmental. These specialist groups meet every other week for about an hour in class to share data sources, definitions of terms, and discussion about presentation of the information. In this way, they can get help from each other about problems they face, and determine how best to prepare their products. In addition, the country groups meet every other week in class for about one hour to discuss their country and piece together a comprehensive picture of conditions.

The products are developed in several stages. Each student is repsonsible for an individual paper that presents their specialty category of information for their country. After these papers are reviewed and graded, the country group must synthesize the information about all the categories and present it in a comprehensive paper about their country conditions. The final comprehensive paper and two of the individual papers on Brazil that were prepared in Fall 1994 are attached as Appendix 1. The instructions for the comprehensive paper require more than a mere cut-and-paste job of the individual papers. Students are required to carefully present an analysis of the relationships among the indicators of conditions studied within the country, and a discussion of trade-offs and complementarities inherent in those relationships. Finally, students present a poster and a brief discussion in class of the highlights of their findings.

IV. Materials Used in Country Studies

In addition to the economics textbook and the supplementary Anderson (1991) book required for the class, students must utilize a wide variety of sources in preparing this project. Primary sources on conditions in developing countries are not widely available so the books and papers brought back from the Fulbright trip in Brazil were quite useful to the students. In particular, data from IBGE publications and analysis from the speakers we heard were invaluable to the students in understanding actual conditions in Brazil.

The main secondary sources of information used were publications from the World Bank and the United Nations. Specifically, the World Development Report (World Bank) and the Human Development Report (United Nations) were useful because of the range of comparative figures they provided for a large number of countries. Other secondary sources of information commonly used for the project were the many reference materials providing country data, particularly about the third world.

V. Notes for the Instructor

The instructor will encounter several difficulties in carrying out a project such as the one described in this paper. The primary difficulty is the balance the instructor must achieve in teaching a heterodox approach to an important subject. Can the students appreciate the uses and abuses of the conventional system and explore alternatives without becoming cynical about the entire subject? I believe so, and also believe it is very important for them to achieve a balanced approach themselves to economics and development.

In addition, students will have difficulty interpreting the alternatives indicators they find. These should be carefully considered by students and choices made about which best fit the criteria outlined in the instruction sheet (Appendix 2). Of course, there are many problems getting data for students to use, or sending them out to find data. Any data the instructor can collect, or have librarians gather, before the project begins can reduce the frustration level. The information I collected in Brazil was enormously valuable in practical use by students. The instructor will find the usual problems with group work and the multiple skills required to do data collection, analysis, and communication with which students often struggle.

VI. Evaluation

I evaluate the success of this project in two ways: through the students' assessment of the experience and through their products. On both counts, this curriculum project scored high. The final requirement of the project is for each student to write a few paragraphs describing their own participation and the sucess or failure of their group in meeting the goals of the project. These were collected and reviewed as I did the final grading for the course. Students were extremely honest in their self-assessments and appeared to be generally honest about their peers' contributions. The vast majority felt the experience was highly positive from a collaborative learning standpoint, as well as from a content standpoint. They had worked very hard on the project but felt they gained a multiplicity of skills and perspectives.

My assessment of the product is positive as well. I am attaching the final paper on Brazil and several of the individual papers as Appendix 1. I believe the students gained a reasonably good understanding of current conditions in Brazil through their selection and interpretation of indicators. They produced a very good synthesis and analysis of the many different conditions affecting quality of life in Brazil. The best way to improve the outcomes of this project would be to follow up the research with a trip to show students firsthand the fascinating and devastating country that Brazil is today.

APPENDIX 1

A Holistic Analysis of Conditions in Brazil

A

Global and Environmental Economic Principles
Professor Rachel Nugent
December 12, 1994

In this paper, we will examine some of Brazil's most significant problems occurring today. These include rapid growth in population, widespread deforestation, large internal and external debts, hyperinflation, a high poverty rate and inequity of income levels. These issues appear to be interrelated; for example, the external debt that Brazil has incurred increased the need for agricultural output, which resulted in serious environmental degradation and increased polarization in income distribution. Poor land-management practices, including rapid deforestation, led to a short-term increase in output; however, land and timber resources were severely abused and threaten long-term economic growth.

Sixty-million Brazilians live in extreme poverty; about two-thirds of the population live below the poverty line (*Hunger 1995*, 1994). A high poverty rate and inequity in income distribution (see Figure 1) appear to result in increased environmental damage in Brazil. Rapid deforestation and diminishment of natural resources has occurred in order to pursue economic growth in the country. By depleting the country's natural-resource base, short-term economic growth may ensue, but long-term growth will suffer as resources are exhausted and threatened. Even if the economy does improve in the short run, a correlating decrease in poverty will not necessarily result. This is because Brazil's wealth is concentrated in the hands of a small segment of the population, leaving a large percentage in relative poverty; as the rich accumulate more and more assets, the poor may remain in the same economic conditions or become even poorer.

Between 1970 and 1980, there was a huge increase in GDP per capita, but in 1970 the top 10% of the population received 46.7% of the county's income – see Figure 1 (Becker & Egler, 1992). In 1980, this number had risen to about 50%. In other words, the small wealthy segment received about half of Brazil's total income, while the bottom segment received 1% in 1986 and less than that since then (Becker & Egler, 1992). If the wealthier elite is the only segment of the population that is expanding economically by depleting the country's natural resources, the poorer segments will remain trapped and with no capital to improve their conditions. In this sense, economic growth will not improve the situation of the poverty-stricken.

The "economic miracle" of the 1970s was a time of great economic growth, but the global energy crisis of 1974 stopped this trend. As a result of this crisis, imported fuel prices increased dramatically, causing Brazil to start a foreign debt. In an attempt to maintain the growth of the 1970s, Brazil continued borrowing from foreign nations. A worldwide economic recession during the 1980s further hindered Brazil's attempt to grow. Falling commodity prices on the international market reduced Brazil's income from exports. In combination with increased governmental spending, Brazil became the world's largest debtor. The external debt grew from $58,011 million to $91,596 million between 1981 and 1987 when the amount of external debt reached a peak, based on real U.S. dollars in 1987 (*Statistical Yearbook*, 1993). As spending continued and income declined, inflation rose dramatically (see Figure 2). Compared to a 31.3% increase between the years of 1965 and 1980, inflation soared by 731.3% between 1985 and 1990 (*World Development Report*, 1992). At the same time, real earnings per employee fell more than 30 points between the years of 1986 and 1990 (*World Tables*, 1994).

In an attempt to maintain the income levels before the recession, a huge increase in agricultural output occurred. In 1988 agriculture represented nearly $8 million of Brazil's total gross domestic product, while jumping to $2.9 billion in 1990 (*Europa World Yearbook,* 1994). Because technology and land management were poor, Brazil increased land area for agriculture through rapid deforestation. Of 3,502,767 square kilometers of forest and woodlands, 16,021 square kilometers were depleted in 1985 alone; between 1989 and 1990, this figure had decreased to 13,800 square kilometers of deforested land (*World Development Report*, 1992). About 10% of the Amazon basin's tropical forests has been destroyed already (Miller, 1992). Not only has the forest destruction in Brazil abused land and timber resources, but it has also contributed to the loss of biodiversity. At least 167 species of mammals, birds, reptiles, amphibians, and freshwater fish are classified as threatened in Brazil – see Figure 3 (Tunstall & van der Wausem, 1992). This number is high when compared with other countries; Colombia lists 104 threatened animal species, while Canada records 26 (Tunstall & van der Wausem, 1992). The cutting and burning of trees has also resulted in high emissions of carbon dioxide (see Figure 4). Although deforestation provided Brazil with immediate income, it carried with it the long-run costs of a significantly diminished resource base and environmental pollution.

Brazil's exploitation of resources is not conducive to supporting its growing population, which has increased dramatically in the last decade alone. The population grew from 121,148,582 in 1980 to 150,368,000 in 1990, a 24.12% increase -- see Figure 5 (*Statistical Yearbook*, 1993). While Brazil's total fertility rate has declined in recent years (from 6.8 to 3.3 between 1965 and 1991), the population is projected to jump to about 246 million by 2025

(Miller, 1992). Although the total fertility rate is lower than it has been, close to 35% of Brazil's population is under age 15 (see Figure 6); the huge population increase is expected to occur as this segment of the population reaches child-bearing age (Miller, 1992). Approximately 75% of Brazil's population lives in urban areas, according to Miller. As more and more of Brazil's rural population migrates to cities in search of employment, urbanized areas are expanding rapidly. From 1980 to 1990, the percentage of rural dwellers decreased by almost 10%, with a corresponding 10% increase in the number of urban dwellers – see Figure 7 (*Statistical Yearbook*, 1993).

As cities become overpopulated, existing environmental and social problems are compounded. More people living within a limited space contributes to problems of air and water pollution, as well as waste and sewer management. However, data indicate that most of the population has access to safe drinking water: 100% of urban dwellers and 86% of the rural population appear to have this access (Hammond, 1992). The inequity between urban and rural access to safe water may be due to available water systems. For example, cities might be more adequately equipped to pipe in safe water for residents, whereas those outside city limits may be forced to seek alternative sources such as untreated river water, which is more likely to be contaminated. Social problems of unemployment and poverty are also linked with overpopulation. Sixty-million Brazilians live in extreme poverty, and about two-thirds of the population continues to live below the poverty line; this results in persisting malnutrition, as about 32 million Brazilians go hungry every day (*Hunger 1995 - Causes of Hunger*, 1994).

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In conclusion, issues of hyperinflation, poverty, large internal and external debts, deforestation, and inequity of income levels will need to be addressed in Brazil on a continuing basis. Even if there is a rapid *short-term* increase in economic growth, social and environmental conditions will not necessarily improve. Only a holistic approach to dealing with Brazil's current problems will be effective in improving the country's conditions in the future.

Figure 1

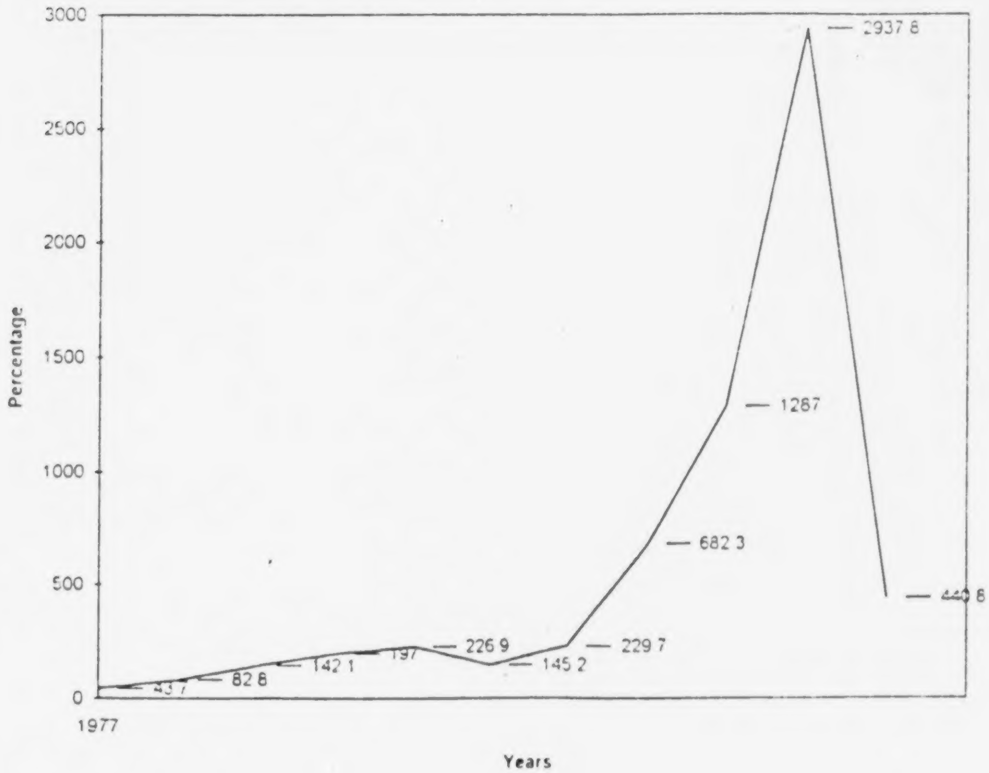
Income Distribution(% of population according to income)

Year	Bottom 10%	Bottom 50%	Top 10%	Top 1%
1970	1.2	14.9	46.7	14.7
1980	1.1	12.6	50.9	16.6
1986	1.0	12.5	48.8	15.2
1989	0.6	10.4	53.2	17.3

Source: Becker & Egler, 1992.

Figure 2

Inflation Rate, 1977-1991



Source: *International Marketing Data & Statistics*, 1993.

Figure 3

Brazil's Known and Threatened Animal Species

	Known Species	Threatened Species
Mammals	394	24
Birds	1,567	123
Reptiles	467	11
Amphibians	487	0
Freshwater Fish	—	9

Source: Tunstall & van der Wausem, 1992

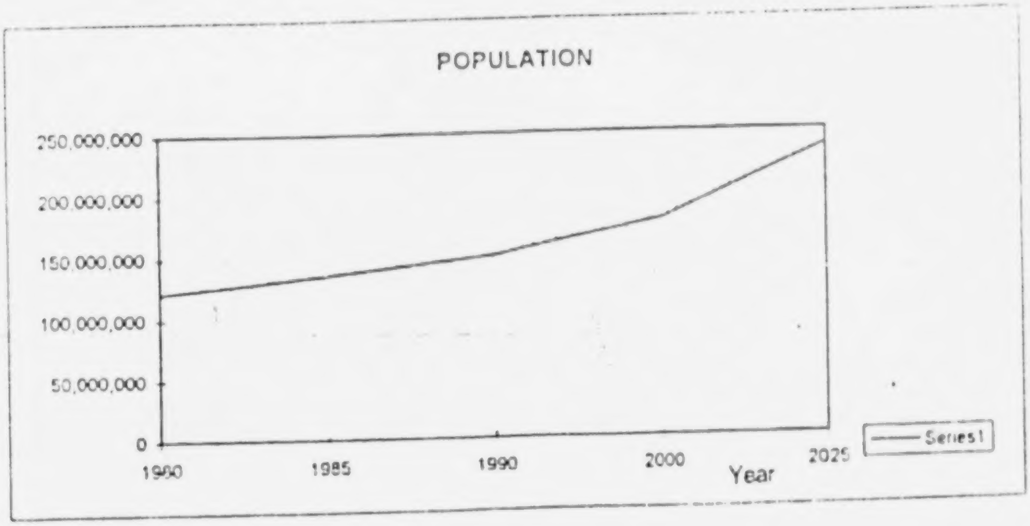
Figure 4

CO_2 Emissions (Land-Use Change and Industrial)
(000 metric tons)

	CO_2 - Land-Use Change	CO_2 - Industrial
Brazil	950,000	206,957
South America	1,800,000	557,298
North & Central America	420,000	5,760,830
United States	22,000	4,869,005

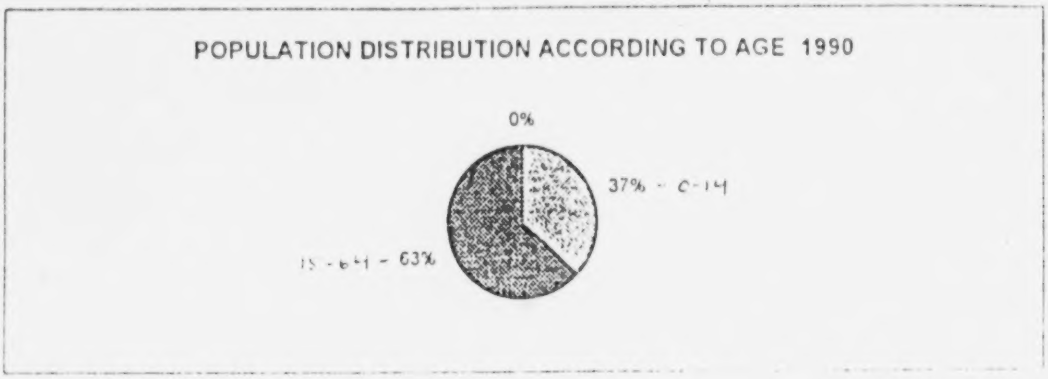
Source. Tunstall & van der Wausem, 1992

Figure 5



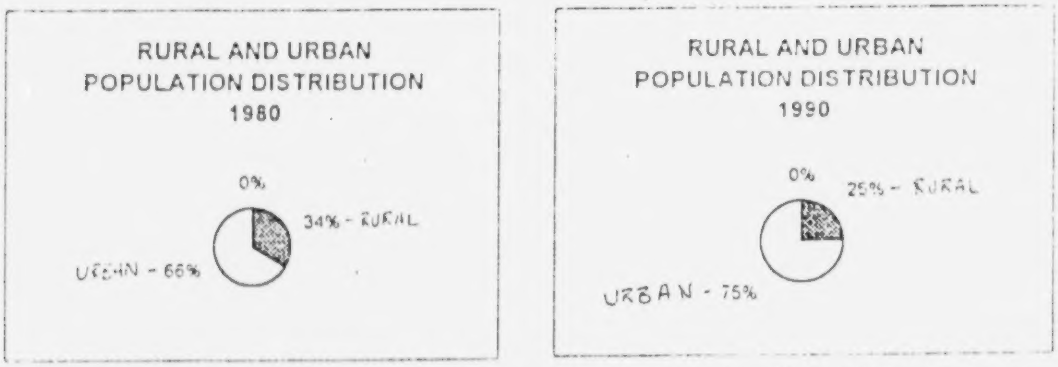
Statistical Yearbook. Issue 38. United Nations Press, New York, 1993.

Figure 6



World Development Report 1992. Oxford University Press, New York, 1992

Figure 7



Hunger 1995 - Causes of Hunger. Bread for the World Institute, New York, 1994

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MACROECONOMICS OF BRAZIL

Several macro-economic indicators of Brazil are examined in the following. These indicators include gross domestic product (GDP) per capita, government debt, and income distribution. These will be used to assess the macro-economic conditions of Brazil. The trends that can be seen in macro-economic indicators indicate some of the strengths and weaknesses of Brazil's economy, and, when examined together, they can point to more specific problems within Brazil.

The GDP per Capita grew during the 1970's, from $1358 (1987 US) in 1972 to $2054 in 1980 (see table 1). During the 1980's, however, it fluctuated between $1776 (in 1983) and $2086 (in 1987). The real GDP grew during the 1980's even thought the GDP per capita remained fairly constant; a steady growth is seen from 1972 until 1989 when it declined slightly[1]. Comparing the rates GDP growth to population growth in the period between 1980 and 1990, the GDP grew at an annual average rate of 2.5%[2] while the population of Brazil grew at an average annual rate of about 2.1%[3]. This indicates that the growth of population has been one cause for the GDP per capita not growing as the GDP has done over the 1980's decade.

The long range trend of government expenditures as a percentage of GDP shows that the rate has not increased significantly since 1965 until 1990.

---

[1] World Tables 1994 John Hopkins University Press, Baltimore, Maryland, 1994.

[2] Europa World Year Book 1994, Volume 1, Europa Publications Limited, London, England, 1994.

[3] World Tables 1994 John Hopkins University Press, Baltimore, Maryland, 1994. (Calculated by Trista Jolly.)

The government expenditures were 11% of the GDP in 1965 and 16% in 1990[4]; here the rate of increase was an annual average of 0.2%. This is significant to the economic conditions of Brazil when one considers the increase of government debt.

The government debt has grown tremendously during the past twenty years. Brazil is reported to have become one of the largest developing country debtors in the world[5] As can be seen in Table 2, Brazil's external debt by nearly 60% from 1980 to 1987. After 1987, the external debt decreased; it was around that year that Brazil could no longer borrow money from foreign sources. Even so, the interest on the debt must still be paid by Brazil to those countries from which it borrowed. This is significant when compared to the government expenditures of GDP which hasn't increased very much.. What this indicates is that the government has spent more money on the debt and had less to allocate elsewhere such as social or environmental programs.

The richest 10% (and 1%) have received an increased percentage of Brazil's income from 1970 to 1989 (see Table 3). This trend is one of the income distribution gap between the richest and the poorest peoples in Brazil growing greater. As can be seen on Table 3, over the past twenty years the population with the lowest 10% of income has received a smaller share of the total income in Brazil; in 1972 the lowest 10% received 1.2% of the total income of the country, yet in 1989 the same percentage of the population received only 0.6% of the country's total income. Likewise the poorest half of the population received 14.9% of Brazil's total income while in 1989 the poorest half of the

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[4] World Development Report 1992: Development and the Environment , Oxford University Press, Oxford, England, 1992.

[5] Europa World Year Book 1994, Volume 1, Europa Publications Limited, London, England, 1994.

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population received 10.4%. If this trend continues, the polarization between the richest and the poorest in Brazil will continue.

The conditions as seen in the data for Brazil are not very encouraging. Although the GDP grew from 1980 to 1991, the population also grew rapidly; GDP per capita grew only slightly during the 1980's. The unemployment rate (see Table 4) has been fairly constant during this time period at rate that is not in itself indicate problems with the economy. Unfortunately, the unemployment figures exclude the rural population of the north which is one of the poorest regions in Brazil. Also, the poor may have jobs, but other factors would indicate that those jobs probably do not pay well. When looking at the inequity in income distribution and GDP per capita, the question of what is the real income of the different income levels in Brazil. With the widening lack of equity in distribution, the rich will be the only ones to benefit from an increase in GDP. The indicators examined are not hopeful for Brazil. The debt is decreasing, but the GDP is not growing very much and population growth keeps the GDP per capita from rising. Overall, it appears that the conditions within Brazil are not improving and may even be declining, especially in respect to the non-wealthy of Brazilian society.

Table 1 : GDP per Capita of Brazil (1987 U.S. $)

Year	1972	1975	1978	1980	1983	1985	1987	1990	1991
GDP/Capita	1358	1666	1839	2054	1776	1931	2086	1940	1923

Source: World Tables 1994, John Hopkins University Press, Baltimore, Maryland, 1994.

Table 2: External Debt (1987 U.S. $)

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Debt (billion $)	58.0	61.7	68.5	77.6	79.0	87.4	91.6	86.5	77.7	72.5

Source: Statistic Yearbook, 38th Edition , United Nations, New York, 1993.

Table 3: Income Distribution (% of population according to income)

Year	Bottom 10%	Bottom 50%	Top 10%	Top 1%
1970	1.2	14.9	46.7	14.7
1980	1.1	12.6	50.9	16.6
1986	1.0	12.5	48.8	15.2
1989	0.6	10.4	53.2	17.3

Source: Bertha K. Becker and Claudio A. G. Egler, Brazil: A New Regional Power in the World-Economy, Cambridge University Press, New York, NY, 1992.

Table 4: Unemployment Rate in Brazil

Year	1985	1986	1987	1988	1989	1990
Unemployed	1861.6	1380.2	2133	2319.4	1891.2	2367.5
Labor Force	55098.4	56816.2	59543	61048	62513.2	64468
Unemployment Rate	3.38%	2.43%	3.58%	3.80%	3.03%	3.67%

Note: Unemployed and Labor force in thousands of people of the age of 10 years and over. Numbers exclude aborigines, non-resident foreigners and rural population of the northern region.

Unemployment rate figured by dividing the labor force by the number of unemployed.

Source (labor force and unemployed): The Europa World Year Book 1994, Volume 1 Europa Publications Limited, London, England, 1994.

Microeconomics in Brazil: The Rewrite

Over the past four decades, Brazil's economy has been a roller coaster. During the 1960's and 1970's, Brazil's economy grew rapidly while it experienced a severe recession during the 1980's. As Table 1 illustrates, inflation has done nothing but increase since the 1960's, and at an alarming rate since 1980. At times inflation has increased over a 1000 percent in less than a year. (World Development Report) Dramatic increase in inflation such as this, is known as hyperinflation. Brazil's hyperinflation is due to many reasons including crop shortfalls, deficit spending, and OPEC oil prices. (Europa World Book) This hyperinflation combined with large external and internal debts have taken a toll on the Brazilian economy. The Europa World Book 1993 has listed a few, the cost of living has skyrocketed, hourly wages have decreased, the cruzado has been devalued numerous times, and unemployment rates have increased.

In 1989 President Sarney introduced the Summer Plan of 1989. (Encyclopedia of the Third World) This was a plan to slow the inflation increases that had been devastating Brazil's economy. This plan included a devaluation of the cruzado, price freezes on essential products, freezes on wages, and the layoffs of 60,000 federal workers. Due to striking workers, this plan was quickly abandoned, but its legacy has been felt years later. Table 1 shows the average annual rate of inflation. A record high of 1307% increase was reached in 1989. Table 2 illustrates the consumer price index between 1986 and 1992. Consumer price index is also known as the cost of living The biggest increase occurring between 1989 and 1990. The change of numbers between 1990 and 1991 is due to a devaluation of the cruzado. Table 3 illustrates a decrease in real earnings per employee between by more than twenty percent during the same time period, and Table 4 tracks employment between 1985 and 1990. This chart shows the first decrease in employment since 1984 by more than twelve points between the years of 1986 and 1990. Each of these areas are important in describing the economic condition of Brazil. Inflation and foreign debts are taking a toll on the Brazilians, not only through an increase in inflation and cost of living, but through a decrease in jobs and wages as well.

Each of the first four tables illustrates the severe economic recession that Brazil faced during the 1980's. The effects which include extreme foreign debt, polarization of classes, and the increase in a large underground economy will be felt for years to come. Inflation must be controlled and debts must be paid to both external and internal sources. On the bright side, Brazil has survived on its trade surplus. Tables 5 and 6 show the totals for exports and imports between the years 1988 and 1990. Each of the three years, exports outnumber imports. Most of this revenue has been used to pay off Brazil's mounting debts.

During the 1980's Brazil was one of the largest exporters of cocoa beans around the world, but due to the combination of a free market as a result of the International Coffee Organization's suspension of export quotas in 1989, as well as world demand for higher grade coffee beans, Brazil's cocoa bean exports plummeted.(Europa World Book) Fortunately, Brazil's sugar exports nearly doubled at the same time the coffee industry's exports were declining. Although the reasons for this increase in sugar exports is not defined, some reasons might include increases production and/or an increased world demand. Of the two increased production seems to make the most sense since Brazil has gone through rapid deforestation to increase agricultural areas and production in order to help pay mounting debts. Table 5 portrays the decline in the cocoa bean exports and increase in sugar exports.

Imports steadily increased and exports roughly remained the same between 1988 and 1990. As Table 6 illustrates, resources, such as machinery and technology are being imported from foreign nations at a gradual increasing rate. These imports can be seen as investments in Brazil's future. Despite revenue being lost in the short run, Brazil might be trying to invest in its future by purchasing these imports, and increasing future output. This increased output would supply Brazil with the much needed revenue to pay debts and slow the inflation rate.

The Europa World Yearbook hints at a long hard road of recovery for the Brazilians. It even states that the recent downfall of the citizen's government could derail and postpone the implementation of a deficit reduction program. I don't see any immediate recovery for Brazil. The hole they dug themselves into during the 1980's is pretty deep, and it is going to be a long, hard fight upwards. The increasing imports of resources as an investment in the future is a bright spot that may help the

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Brazilians in their fight. The uncontrollable inflation rate must be slowed in order to stabilize the rest of the economy. Once this is done, the Brazilians will be well on their way to recovery.

not significantly improved

B

Table 1: Average Annual Rate of Inflation(Percent)

1965-1980	31.3
1980-1988	188.7
1989(record)	1307.0
1980-1990	284.3
1985-1992	731.3
1992	1008.7

•World Bank. (1992). World Development Report. England: Oxford University Press

Table 2: Consumer Price Index(1987=100)

1986 = 30.3

1987 = 100.0

1988 = 782.3

1989 = 10,850.4

1990 = 329,613.1

1991 = 1.78E+06

1992 = 1.98E+07

•World Tables 1994. Baltimore, Maryland: Johns Hopkins University Press.

Table 3: Real Earnings per Empl.(1987=100)

1986 = 103.0

1987 = 100.0

1988 = 96.9

1989 = 97.8

1990 = 72.6

•World Tables 1994. Baltimore, Maryland: Johns Hopkins University Press.

Table 4: Employment(1987=100)

1985 = 95.5

1986 = 106.2

1987 = 100.0

1988 = 97.9

1989 = 99.3

1990 = 93.8

•World Tables 1994. Baltimore, Maryland: Johns Hopkins University Press.

Table 5: Exports(US $ '000)

	1988	1989	1990
Cocoa beans	215,495	134,324	127,785
Sugar	345,084	305,507	511,873
TOTAL	33,789,365	34,382,620	31,413,756

•The Europa World Yearbook 1994. (35th ed.). London, England: Europa Publications Limited.

Table 6: Imports(US $ '000)

	1988	1989	1990
Machinery & Mechanical equipment	3,670,128	4,179,206	5,176,410
Transport equipment	524,755	693,481	755,841
TOTAL	14,605,254	18,263,238	20,661,361

•The Europa World Yearbook 1994. (35th ed.). London, England: Europa Publications Limited.

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APPENDIX 2

Economics 130
Fall 1994
Professor Nugent

Instructions for Country Project

You are required to participate in a group project that comprises 35 percent of your grade in this class. The primary objective of this project is to develop an appreciation for and understanding of quantitative measures of country performance in four areas: macro-economic, micro-economic, environmental, and social. These performance measures are to be collected by each country group and used to portray a comprehensive and thoughtful portrait of conditions and trends in each country. Thus, secondary objectives are: developing data collection skills, learning to interpret quantitative measures (understanding the uses and limitations of such), manipulating and analyzing comparative data, communicating knowledge in a specific manner, and working cooperatively. I hope the development of these skills are consistent with your personal goals for this class.

There are four parts to this project:

- **Data collection (5 percent)**
  You will begin this process by collecting specific indicators each week during the first half of the semester. You will receive a separate grade for fulfillment of these assignments. As you search for the specific indicators, you will be expected to develop skills at finding and understanding such data. You will then develop a list of additional indicators that are important in your country and are expected to collect and analyze that information on your own (with my help).

- **Interpretation and communication in a brief written paper (10 percent)**
  Your data collection and analysis effort will culminate in a brief paper in which you describe the conditions in your country for the category you have chosen. The paper should be in narrative form, but its main purpose is to present the important data you have selected to describe your country conditions. Thus, you should present the data in the most appropriate form (generally graphs, charts, tables, etc.) and briefly explain the meaning. Your paper should have an opening that tells what the intent of the paper is and a conclusion that provides your interpretation of country conditions in your category. In between, you will have the data and analysis. The entire paper should be no longer than 3 pages (plus graphs, etc.), and must have footnotes as necessary and references.

- **Synthesis and communication in a group paper (10 percent)**
  You will receive comments, suggestions, and a grade on your individual paper. You should revise it as necessary and then, working as a group, take the four category papers for each country and turn them into one cohesive synthesis of conditions in your country. This paper requires more than simply stapling the four papers together! You must work with each other to understand the relationships among the four categories, how they influence each other, which indicators are most important in describing your country, and how to present the information as a whole.

- **Creation and presentation of a poster (and other audio or visual means as desired) (10 percent)**
  As a group, you will select the most important indicators and compile them into a visual portrait of your country in poster format. Keep in mind that a poster serves a different purpose than a paper! It should be attractive, organized, easily understood, and have a theme. You can use text, but concentrate on graphics, pictures, etc. You may certainly include supplements in your presentation, such as music, video presentations, posters, etc. to give the class and me the opportunity to really know your country. Posters and presentations are due on the final exam day. Each group will have 10 minutes to summarize the theme and contents of their poster. Please inform me in advance if you have special requirements for more time (e.g. a video, etc.) or for special equipment.

Finally, each person is required to turn in a short statement on final exam day summarizing the group interaction during the preparation of this project. Briefly tell me whether the group worked well together, and if not, why not. If there were major problems with any individuals, let me know. Also be sure to comment about your own level of effort and cooperation. This last paper does not preclude you (or excuse you) from coming to me before the end of the semester to let me know if there are problems with your group. Sometimes I can help resolve difficulties, sometimes I can't. But it is your responsibility to make the group part of this project a rewarding, pleasant, and educational experience for all involved. This means becoming teachers for each other when you explain your own data analysis, work on the paper and poster, and present your findings. This is a tough role, but if you each do it, you will all learn much more than you can by yourself. Good luck!

CRITERIA FOR USEFUL INDICATORS

Available
Understandable
Measurable
Significant
Short Time Lag
Comparable

Social

% below poverty line
education level
female school enrollment ratio
low birth weight babies
infant mortality
population growth
calories consumed as % of required
age distribution
crime rate

Micro

productivity growth rate
female labor force participation rate
capacity utilization
industrial production
sectoral GDP and growth rate
CPI
x prices/import prices
capital investment
FDI
hourly earnings
unit labor costs

Macro

water access
water consumption per capita
solid waste per capita
electricity consumption
species
commuters
deforestation
CO2 emissions

Environmental

unemployment rate
income distribution
per capita income and growth
government deficit
government debt
savings rate
trade deficit/surplus
external debt

Professor Nugent
Economics 130
Fall 1994

Country Sub-Group Assignments for Data Collection

Due Date 9/15/94

Social: A paragraph describing conditions in your country
Environmental: A paragraph describing conditions in your country
Microeconomic: A paragraph describing conditions in your country
Macroeconomic: A paragraph describing conditions in your country

Due Date 9/22/94

Social: population growth rate, 10 years
Environmental: access to clean water, 5 years
Microeconomic: labor force participation rate
Macroeconomic: per capita GDP

Due Date 9/29/94

Social: education level
Environmental: energy consumption per capita
Microeconomic: foreign direct investment
Macroeconomic: unemployment rate

Due Date 10/6/94

Social: calories consumed as % of requirement
Environmental: deforestation rate
Microeconomic: hourly earnigs
Macroeconomic: government expenditures as % of GDP

Due Date 10/13/94

Social: poverty rate
Environmental: CO_2 emissions
Microeconomic: sectoral output
Macroeconomic: income distribution

Due Date 10/20/94

Social: infant mortality
Environmental: threatened species
Microeconomic: export prices/import prices
Macroeconomic: government debt

USING THE FUNDAMENTAL THEMES OF GEOGRAPHY TO EXAMINE BRAZIL

Presented
to
The Fulbright Commission - Brazil

by
Linda Reeves
August 1994

USING THE FUNDAMENTAL THEMES OF GEOGRAPHY TO EXAMINE BRAZIL

In 1984 the five fundamental themes of geography were published in the Guidelines for Geographic Education. These five themes included the following: (1) location, (2) place, (3) human/environmental relations, (4) movement, and (5) regions.

These themes represent much more than just place and location. They serve as a vehicle to help students understand the critical interface between physical and human environments, the complexities of human movement and interaction with the land. They allow students to understand population pressures, the human use of resources, and the differences between the developing world and the developed world.

The following units will be dealing with only three of the fundamental themes: location, place, and human/environmental relations. These units are designed to help the middle school student (grades 6th-8th) develop a greater understanding of Brazil.

Each unit will include a section entitled "Procedure" where students will be asked to complete a variety of exercises. The following approaches can be used to complete those exercises:

*oral presentations
*small group research
*competitive teams
*graphic presentations
*debates
*student(s) teaching concepts
*knowledge bowls
*simulations
*individual research
*quiz shows

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UNIT 1: LOCATION

GRADE LEVEL: Middle School (6th-8th)

OBJECTIVE: The student will describe Brazil by identifying its absolute location (a global address) as well as its relative location. Students will explain how a number of geographic factors interact to give significance to that location.

SUGGESTED MATERIALS:

atlases
maps (world, South America, Brazil)
Brazil in Brief
Brazil in Figures
Cultures of the World-Brazil

PROCEDURE:

1. Using a map, students will find the extreme points of Brazil on a map and identify the approximate latitude and longitude of these points.
2. Students will use various maps to identify political divisions (Table 1).
3. Students will examine Brazil's "relative" location by comparing its location to that of their home state and the United States.
4. Students will examine Brazil's relative position within the continent of South America. Neighboring countries and coastal bodies of water will be identified. The extent of borders will be examined using Brazil in Figures (Table 2). Brazilian borders will be compared and contrasted with borders between the United States and its neighbors.
5. Students will examine Brazil's relative position to Portugal, and Africa, as well as its relative position in the world.

TABLE 1 A BASIC MAP OF BRAZIL

(from Cultures of the World-Brazil, page 124)

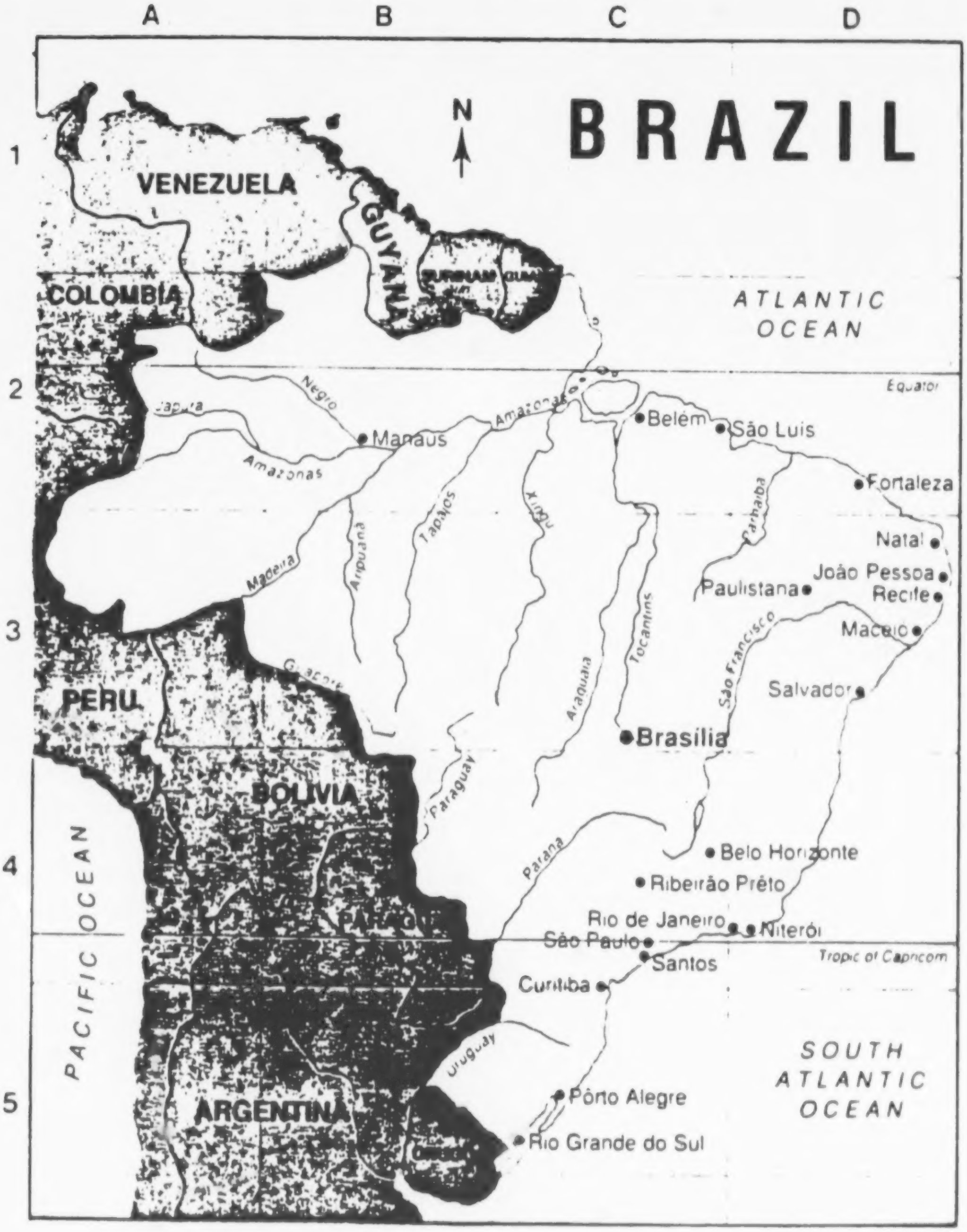
A
B
C
D
1
2
3
4
5
BRAZIL
N
VENEZUELA
GUYANA
SURINAM
GUIANA
COLOMBIA
ATLANTIC OCEAN
Equator
Negro
Japura
Amazonas
Amazonas
Manaus
Belém
São Luis
Fortaleza
Natal
João Pessoa
Recife
Paulistana
Maceio
Salvador
Parnaiba
Tocantins
São Francisco
Xingu
Tapajos
Aripuana
Madeira
Araguaia
Guapore
PERU
Brasilia
BOLIVIA
Paraguay
Parana
Belo Horizonte
Ribeirão Prêto
Rio de Janeiro
Niterói
São Paulo
Santos
Tropic of Capricorn
Curitiba
PARAGUAY
PACIFIC OCEAN
Uruguay
SOUTH ATLANTIC OCEAN
Pôrto Alegre
Rio Grande do Sul
ARGENTINA
URUGUAY

TABLE 2 BRAZILIAN BORDERLINES AND COASTLINES

(from Brazil in Figures, page 11)

Extent of the border line, by neighboring countries and the Atlantic - Ocean

ESPECIFICATION	EXTENT OF BORDER LINE	
	Absolute (km)	Relative (%)
TOTAL	23,086	100.00
Neighboring Countries	15,719	67.97
Colombia	1,644	7.11
Venezuela	1,495	6.47
Guyana	1,606	6.94
Suriname	593	2.56
French Guiana	655	2.83
Uruguay	1,003	4.34
Argentina	1,263	5.46
Paraguay	1,339	5.79
Bolivia	3,126	13.52
Peru	2,995	12.95
Atlantic Ocean	7,367	32.03

SOURCE - IBGE. Diretoria de Geociências, Departamento de Cartografia

UNIT 2: PLACE

GRADE LEVEL: Middle School (6th-8th)

OBJECTIVE: The student will explore distinctive characteristics of Brazil dealing with landforms, population factors, settlement patterns, and vegetation (flora) and animal life (fauna).

***Characteristics could also include physical characteristics such as climate, soils, and water, and human characteristics such as religion, language, and economic activities.

SUGGESTED MATERIAL:

atlases	maps and globes
Brazil in Brief	Brazil in Figures
Sao Paulo 92	Cultures of the World-Brazil
The Last Rain Forests	

PROCEDURE:

***Student reactions will be shared in journals/class discussions

1. Students will identify key physical features (rivers, mountain ranges, plateaus, etc.) of Brazil and suggest how each of these has influenced the life of its people.
2. Students will examine the population distribution in the country (Tables 3 and 4) and suggest potential problems arising from this distribution.
3. Students will examine information concerning the population of Brazil as well as the city of Sao Paulo (Tables 5 and 6).
4. Students will examine information concerning the Atlantic Rain Forest that borders Sao Paulo (Table 7).
5. Students will react to information gathered in #1-4.

TABLE 3 TERRITORIAL OCCUPANCY/POPULATION DENSITY

(from Brazil in Figures, page 18)

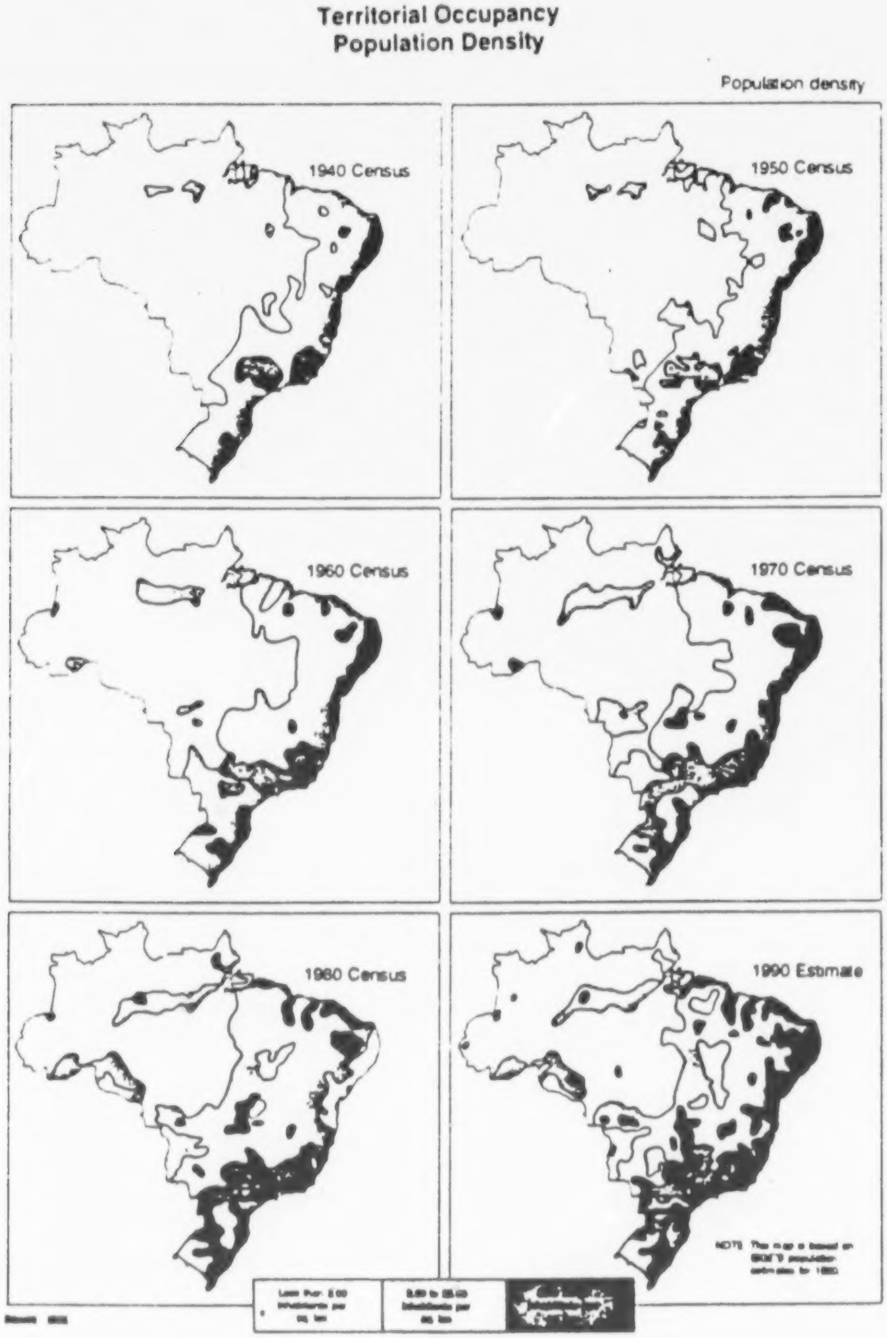
Territorial Occupancy
Population Density
Population density
1940 Census
1950 Census
1960 Census
1970 Census
1980 Census
1990 Estimate
NOTE This map is based on IBGE'S population estimates for 1990
Less than 2.00 inhabitants per sq km
2.00 to 25.00 inhabitants per sq km

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TABLE 4 POPULATION DISTRIBUTION

(from Cultures of the World-Brazil, page 42)

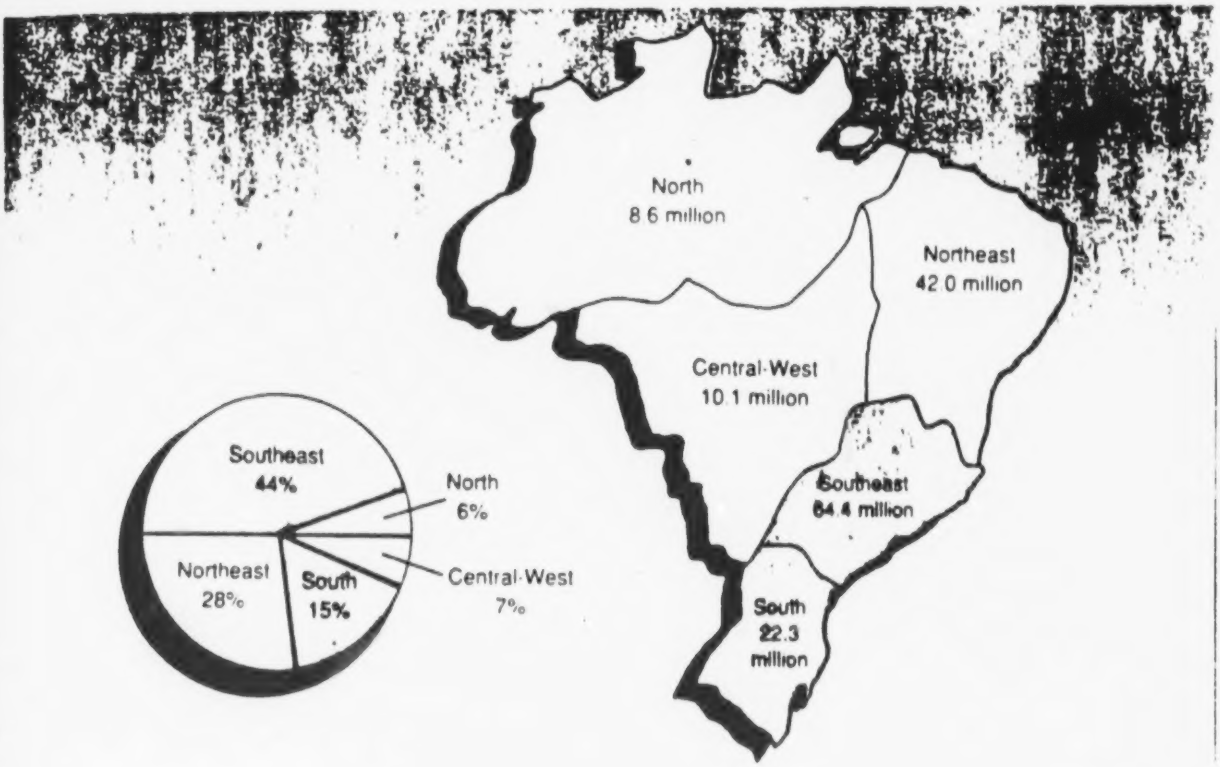
North
8.6 million
Northeast
42.0 million
Central-West
10.1 million
Southeast
64.4 million
South
22.3
million
Southeast
44%
North
6%
Northeast
28%
South
15%
Central-West
7%

TABLE 5 POPULATION OF BRAZIL AND SAO PAULO

(from Cultures of the World, page 42, 44-45)

BRAZIL

*current growth rate of 2%

*population of 148 million which will double in 34 years

*two-third of Brazilians are below 30 years of age

*a growing population is needed to colonize the interior regions

*crowded cities on the coast are absorbing most of the growth even though people are moving to the interior

*Sao Paulo, Brazil's largest city, mushroomed from 3.8 million people in 1960 to 10.1 million in 1985

*one of five Brazilians live in the metropolitan area of Sao Paulo, Rio de Janeiro or Belo Horizonte, the three largest cities

SAO PAULO

*attracted the bulk of Brazil's European and Asian immigrants

  *Moslems, Jews, and Christians from Lebanon, Syria, and Turkey live peacefully in the neighborhood of Bom Retiro

  *more than a million residents of Italian descent can be found in Bela Vista

  *Liberdade is home of most of Sao Paulo's 600,000 Japanese immigrants

*draws most of the rural peasants flocking to the cities in search of better opportunities

*thousands of migrants come from the northeastern Brazil live in the neighborhood of Bras

TABLE 6 THE CITY OF SAO PAULO(from Sao Paulo 92, pages 25-33)

*moved from an economy based on the exploitation of the land (agricultural endeavors of sugarcane and coffee and mineral extraction) to predominantly industrial

*30,000 inhabitants in 1872...65,000 less than 20 years later... 240,000 by the turn of the century...19 million in the 1990's

*the 400 or so manufacturing establishments at the turn of the century grew to become 4,000 at the end of World War I

*Sao Paulo represents 0.001% of Brazil's territory but harbors 10% of the country's population...one out of every ten Brazilians lives in the Sao Paulo Metropolitan Region

*19 million people have been settled into the city, its outskirts and natural spaces that should have been preserved... illegal housing subdivisions, slums, irregular and unsafe buildings

*population density of 500 people per square kilometer

*population explosion has led to degradation of watersheds, the occupation of river floodlands, the proliferation of diseases, lack of basic sanitation, poor education

*between 1940 and 1980, the population growth rate was close to 3.5%, significantly above Brazil's average

*in 1970 only 17 Brazilian cities had populations of 100,000 or more; by 1980 that number had grown to 32...19 million people in Sao Paulo Metropolitan area and 13 million in the city proper

*highly urbanized and settled without the benefit of planning

*problems for 13 million inhabitants:

    *90% of the sewage remains untreated

    *45% of the sewage is not even drained

    *12,000 tons of garbage are generated every day

    *there are 468 points subject to flooding

    *4 million autos emit 4,000 tons of carbon monoxide daily

    *of the 19 million in the metro area, 1 million live in watershed protection areas devoid of infrastructure

    *3 million people live in substandard housing (slums)

TABLE 7 THE NEIGHBORING ATLANTIC RAIN FOREST AREA

(from The Last Rain Forests, pages 130-135)

*think of deforestation, and most people think of the Amazonian rain forests...in greater danger of disappearing are the forests on the east coast...the Atlantic rain forest

*use to cover 385,000 square miles, stretching from the state of Rio Grande do Norte at the easternnmost tip of Brazil down as far as Rio Grande do Sul, the southernmost state in Brazil, in a strip ranging from several to 100 miles wide

*has been reduced to one to five percent of its original size

*houses 2,124 species of butterfly, two-thirds of all of Brazil's butterflies

*17 of the 21 primates species in the Atlantic forests are unique to the region

*half of the tree species are unique to the area

*many species are endangered and some have already become extinct

*Amerindians inhabited the area around 10,000 years ago but were driven from the area 1,500 years ago to the less productive highlands

*the first area to be colonized by Europeans in the 1500's

*the forests were first exploited for their timber, and then the fertile lands were converted to agricultural plantations, particularly for the cultivation of sugarcane

*gold and diamonds were discovered in the late sixteenth century, whole forests were cleared for the mines and the farms needed to feed the miners

*after the mines were exhausted, agriculture became the next most important activity (coffee, bananas, and rubber)

*currently the heart of Brazil's agriculture and industry

*houses two of the three largest cities in South American (Sao Paulo and Rio de Janeiro)...and forty-three percent of Brazil's rapidly growing population of 148 million *current law states that 20 percent of this forested area has to be kept as forest...however, the fines for violating this are only a fraction of the income that can be obtained by selling the wood

*a mere 0.1 percent of the original forest expanse is protected in national parks, biological reserves, ecological stations, state parks, and private reserves

*protected areas lack adequate financing, management, and means of enforcing existing protective legislation

*scientists have dropped millions of gelatin bombs, each loaded with about 10 seeds of tropical plants...hoping to prevent landslides on the deforested slopes near Sao Paulo

UNIT 3: HUMAN-ENVIRONMENTAL RELATIONS

GRADE LEVEL: Middle School (6th-8th)

OBJECTIVE: Students will explore the connections that exist between man and his environment. Students will show how change in one almost certainly involves change in the other.

SUGGESTED MATERIALS:

"Cultures of the World - Brazil
Curitiba: A Model City"
"Curitiba: A City of the Future"
The Decade of Destruction
The Last Rain Forests
The Rainforest Book
Voices from the Amazon

PROCEDURE:

Student reactions/information should be shared in personal journals as well as in class discussions.

1. Students will examine information about rain forests from The Last Rain Forests (Tables 8 and 9), Cultures of the World-Brazil (Table 10), and The Rainforest Book (Tables 11 & 12). Students should note their reactions in their journal. In addition, they should list questions they would like to have answered about the rain forest.

2. Students will now be involved in a mini-unit dealing with different groups of people who share an interest in the Amazon rain forest.

MINI-UNIT: PEOPLE IN THE AMAZON RAIN FOREST

A. Students are asked to think about the Amazon rain forest and consider the different people who have an interest in the area: indigenous people(Indians), loggers, river people, miners, settlers, cattle ranchers, rubber tappers, and environmentalists. After reading a brief description of each group, students should individually prepare a two-column analysis of each group. Column one should include the positive things about this group being in the Amazon rain forest. Column two should include the negative things that occur as a result of the group being in the Amazon rain forest. Students should consider the effect one group can potentially have on each of the other groups.

B. Acknowledging that the Amazon rain forest is a limited environment, each student will be asked to individually assign each group a numerical value or ranking based on the group's relative value to the rain forest. Students are being asked to decide who is most important to the rain forest to who is least important to the rain forest.

C. Students are asked to meet in small groups and share information from their individual charts and numerical ranking. Then each group of students is asked to create a group chart and ranking, synthesizing their personal ideas from A and B.

D. Representatives from each group will share information from C with the entire class.

E. Students will read/hear selections from Voices from the Amazon (Table 13) and respond to each of the selections in their journals. Students will revise their original two-column analysis of each group...first seeing it through the eyes of a group member, then seeing it through the critical eye of an outsider.

(As an alternative, the class could be divided into groups representing the different groups in the rain forest. Each group would be responsible for telling about its work/role in the rain forest.)

F. Students will be asked to revise their earlier numerical ranking if needed. Written justification for that ranking will also be needed.

G. Students will meet in small groups and revise their group numerical rating if necessary. A group leader will share both rankings with the class. Student reactions will be shared with the class as well.

3. Students will examine information concerning "What's Next and the United Nations Conference" (Table 14).

4. When one attempts to understand the complex scheme of development within a country like Brazil, one must also examine the efforts put into creating ecological-sound urban population centers. The city of Curitiba, Brazil's Ecological Capital, will examined.

*Students will be asked to brainstorm the different ecological problems that their city and cities within the United States face. Students will also be asked to list different ways these problems have been or could be addressed. This will be recorded in their journals.

*Students will read the article entitled " Curitiba: A Model City" from The Brasilians, a monthly newspaper published in New York City. (See Table 15). Students will be asked to identify what makes Curitiba different than the typical city they know.

*Students will view the 1992 video entitled "Curitiba: A City of the Future." This twelve minute video is available from the World Bank in Washington, DC.

*Students will then discuss the possibilities of taking the ideas from Curitiba and applying them to their own community.

*Students should now examine a case of poor planning... Polonoroeste, A Development Program (Tables 13,16, and 17).

5. Students will be asked to write to one of the organizations listed in The Rainforest Book by Scott Lewis (see Table 18) or on the list of "Student Environmental Networks and Organizations" (Table 19) provided by the Colorado Division of Wildlife.

6. Some people feel that development is synonymous with destruction in Brazil. Students may choose to agree or disagree and support their position through a written piece (essay, personal narrative, etc.), poetry, artistic piece, etc.

*** For additional learning opportunities, students can examine the following selections:

- *Chico Mendes (Table 20)
- *Debt-For-Nature-Swaps (Table 21)
- *Can the Indians Really Be Saved (Table 22)
- *What Can People of The Amazon Do (Table 23)
- *True/False Quiz - Amazon Ecology (Table 24)

TABLE 8 WHAT ARE RAIN FORESTS?

(from The Last Rain Forests , page 14)

*the term "rain forest"
    *first coined in 1989 by a German botanist named Schimper
    *describes forests that grow in constantly wet conditions
    *rainfall is more than 80 inches and evenly spread throughout the year
    *found in temperate and tropical regions
    *best-known occur in a belt around the equator
    *overhead is a closed canopy with few large gaps between trees
    *two broad categories: lowland and montane
        *lowland forests are most extensive
        *lowland are accessible and have suffered the most damage
        *a lowland forest has a canopy that can reach a height of 150 feet
        *a few trees in the lowland forest are called emergent and can break through the canopy and attain heights of 200 feet
        *montane rain forests are smaller in stature
        *montane rain forest growth is restricted by low temperatures, unpredictable rainfall, and lack of nutrients at higher altitudes
        *montane forests help prevent soil erosion in the highlands and flashfloods in the lowlands
    *mangrove forest is a type of rain forest found in silt-rich, saline coastal waters

TABLE 9 HOW DO RAIN FORESTS PROTECT OUR ENVIRONMENT?

(from The Last Rain Forests , pages 34-35)

*deforestation allows for the erosion of thin and fragile soil
*deforestation can be responsible for droughts, flooding, and landslides

- the thick foliage and complex root systems regulate water supplies
  - in a well-forested watershed, 95 percent of the annual rainfall is detained in the sponge-like network of roots
  - water in the wildlife is released back into the atmosphere through evaporation and transpiration...reducing total water run-off and maintaining streams and rivers flowing even during dry seasons

    (the recycling of water from east to west in the Amazon Basin plays an important part in keeping the Amazon Basin wet. The westerly regions are thousands of kilometers from the Atlantic and rely on water passed on through this system)
  - globally, more than a billion people depend on water from tropical forests for drinking and irrigation
  - affects the local climate by maintaining rainfall patterns...cutting down trees reduces atmospheric humidity and so reduces rainfall
  - have greater climatic effects...even thousands of miles away...by pumping enormous amount of water into the atmosphere, they have a cooling effect in tropical regions, and act to warm the higher latitudes
    - clouds gathered over the forests reflect sunlight away from the tropics
    - evaporation cools the leaves of the trees, and as the water vapor condenses in clouds above the the forest, heat is regenerated...since circulation of air masses is away from the equator to higher latitudes, a proportion of this heat is transported outside the tropics to cooler areas
  - the animals and plants of the forest are based on carbon... when the forests are burned, carbon is released in the air as carbon dioxide and adds to the greenhouse effect

TABLE 10 THE AMAZON

(from Cultures of the World-Brazil, pages 8-9)

*covers forty percent of Brazil
*on its own, would be the world's seventh largest nation
*dominate features: Amazon River and Amazon jungle
*Amazon River is the final link in a system of 1,000 rivers
*seventeen of these rivers flow over 1,000 miles before they empty into the Amazon River
*Amazon River is the second largest river in the world
*every second, it sends 80 million gallons of water into the Atlantic Ocean...more than the next three biggest rivers put together
*water for the Amazon River comes from the Andes Mountains in the west, the Guiana Highlands in the north, and Brazil's Central Plateau in the south
*Amazon jungle covers most of this basin
*Spaniards searched the Amazon jungle 400 years ago looking for the mythical El Dorado, a city filled with gold.
*Indians who have never met an outsider still exist in the jungle
*botanists believe the 25,000 plants catalogued from the jungle represent only half of the jungle's total
*countless creatures exist among the Amazon's 10,000 known species
*the first explorers who crossed the Andes found Indians using a white crystal taken from the bark of the cinchona tree as medicine..quinine offers protection against malaria

TABLE 11 RAIN FORESTS (from The Rainforest Book)

*half of the Earth's tropical forests have been burned, bulldozed, and obliterated

*tropical rain forests are being wiped out at a rate of 35.2 million acres a year
or 67 acres a minute...the size of a football field

*deforestation wipes out 17,000 species of plants and animals each year...48 species every day...2 species an hour

*facing extinction are indigenous people of the rain forests...rain forests allow their physical and cultural survival

*the complex network of interdependencies grows weaker each day as species are removed

*How many species can be lost before the global ecosystem collapses?

*How many more trees can we lose before global warming becomes irreversible, causing widespread drought, rising seas, and other disastrous changes?

*causes of deforestation are complex...agriculture, logging, ranching...population growth, poverty, foreign debt, multilateral aid policies

(pages 7-8)

TABLE 12 EARTH'S TROPICAL RAINFOREST (The Rainforest Book)

- *3.4 million-square-mile green band that encircles the equator...it use to be 8 million square-miles
- *home to half of all living things on earth
- *covers less than 7 percent of the land surface on the globe
- *distinct layers
  - ***top layer**...emergent trees that tower 160 feet or higher
  - ***canopy**...treetops, vines, and other plants living at 100 to 130 feet above the forest floor...the most luxuriant layer
  - ***understory**...seedlings, saplings, bushes, and shrubs...50 to 80 feet above the ground
  - ***forest floor**...limited plant growth...all but 1 to 2 percent of available sunlight is blocked out...scattering of leaves, decaying matter, seedlings, and small plants
- *numerous tree species in an acre but only a few of each...each species is more vulnerable...when trees go, so do species that depend on them
- *Why preserve the rainforests?
  - *home to indigenous people who have much to teach us
    - *about medicinal and edible plants, farming and irrigation methods
    - *ways to protect crops from diseases and insects
    - *about their customs, traditions, etc.)
  - *regulates the world's weather
  - *helps prevent global warming (greenhouse effect)
  - *genepool/biodiversity...genetic information
  - *products (rubber, etc)
  - *prevent and alleviate flooding/droughts
  - *retain topsoil
  - *buffer the impact of storms

Why are rainforests being cleared?

- *grow crops
- *grazing land for cattle
- *wood gathering for domestic fuel
- *logging
- *mining
- *highways and dams

TABLE 13 SELECTIONS FROM VOICES FROM THE AMAZON

(Binka le Breton, 1993)

"We were entering the project area known as Polonoroeste, a development scheme designed and carried out with ample funding and expert technical advice. Done with the best of intentions, it nevertheless led to the destruction of the forest on a scale previously unimagined.

The government had looked west and had seen what appeared to be a huge, fertile, empty land. It decided to open up that land to provide homes for the homeless and food for the nation. But the government fell prey to one of the myths of the Amazonia: the myth of the empty wilderness. It was 1.3 million square miles-the size of India-and they called it a "land with men for men without land." The government also saw in the Amazon the old dream of El Dorado-a place of inexhaustible riches. It set its sights not only on the land but also on the gold and minerals that lay beneath it.

Men and women from all over Brazil were lured by the gold in the rivers, minerals in the earth, land for the taking, and the nationalistic promise of 'Greater Brazil.' They came by the thousands. What they found was a land neither fertile more empty. They found, to their surprise, Indians and river people and rubber tappers already living in the forest. And sometimes they found themselves in bloody conflict over the land." (page 3)

SETTLERS...Suppose a government faces two problems: millions of its people are landless and destitute, and there are vast areas of land that need to be open up for development. What can be more logical than to bring the people to the land...

For the last thirty years, the government of Brazil has made vigorous efforts to fit the two parts of the equation together by moving the people without land to the land without people...the idea was right...

Nobody had experience running settlement schemes...settlement schemes were laid out by bureaucrats who didn't pay any attention to the topography of the place...the plots were arranged in identical rectangles, and of course some of them were completely flooded; others didn't have a drop of water...we didn't get any help with the things we needed like seeds, fertilizers and credit and marketing...reasonable laws weren't in place...no one had any experience with agriculture in the forestlands...it wasn't easy for us to clear the land...we had to cut it and burn it...waste of good wood...we didn't have time to wait.

We totally underestimated the number of people willing to come up here and make a new life for themselves...we didn't have enough people or resources to cope...

The problem was the soils, you see. Most of them just aren't suitable for agriculture. But it took us a few years to find that out. When you first clear the land, there's still a bit of fertility in it...the third year is often a dead loss...the tragedy is that so many of the settlers failed...sometimes they would clear far more land than they could possibly manage with only their families to work...malaria...they cleared the land and made pasture, and the grass got invaded by capoeira scrub...it's hard to clear out...cattle won't eat it...a sure sign of degraded land.

These days they're abandoning cocoa and coffee... The prices are down, and they're simply too much work...they couldn't get their stuff out to market...one of the toughest things was transport...they're a scandal, the roads in this place...fancy having a state that isn't even connected to the rest of a country by a tarmac road...so we had to sell to the traders...the inputs are expensive too. They're growing subsistence crops instead: rice, beans, and manioc...(pages 58-75)

INDIANS..We are the first people. For centuries we have hunted in these forest and fished in these rivers. Without us the white man could not have survived. We showed him how to live here...We know the soil needs to rest. We are not like the settlers who come in here and cut everything. We clear small gardens and we plant our sweet potatoes and yams and manioc...We hunt the animals of the forest for our food...We keep no domestic animals ...Everything we need comes from the forest..The white man invades our forests, he cuts our trees, he takes gold from our rivers. In the past our people died from slavery and disease; now we are dying because the white man is taking our lands. The ranchers try to seize them, settlers invade them, and government confiscates them in order to put in big dams and new roads. They talk of moving us onto settlement schemes as if we were white men. But we are not white men. We do not own the land. We honor her, we use her, she is our mother.

Everything must change. We must produce things so that we can have money to buy other things. The rhythm of our lives must change. We used to hunt when we were hungry, rest when we were tired, feast when we were happy. Now we eat your food, and we grow fat and lazy, and we are no longer strong like we used to be. Before, we were rich; now we are poor.

The issue for the Indians is harsh by simple; extinction or integration. (pages 9-20)

Their arrival (the settlers) was nearly the end for the Indians. Within twenty years the indigenous population of Rondonia declined from 30,000 to 6,000. We have been living in harmony with nature for thousands of years, said one of them. Yet in less than 500 years outsiders have destroyed our forests, exterminated our wildlife, polluted our rivers and lakes, destroyed our cultural, religious, and ecological traditions, and enslaved and prostituted our people. (pages 3-4)

"The government also faces a dilemma. Large area of Amazonia, with all its economic potential, are claimed by a tiny number of Indians." (page 19)

"In November 1991, then-President Collor's government was hailed internationally for demarcating reserves for the Yanomami and the Mencragnotire Kayapo. Presently the Yanomami's land

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rights to 23.5 million acres and the Mencragnotire's to 12.3 million acres have been officially recognized. The Indians, however, do not have the rights to the subsoil (that is, to minerals)." (page 19)

LOGGERS..."These forests were given to us by God to be used. I go in there, I get out the good trees, I move on. Now there's a lot of trees that are fine timbers, but they're not known outside Amazonia. So there's really no market for them. It's a pity really, a waste, you might say. The international market only works with only the few woods it knows...

Of course, we've got to make roads before we can get the trees outs...We've got to get in and out of thee while the weather holds up...

The good woods, sometimes there's not more than a handful of them in several acres...If our technology was a bit more advanced we wouldn't be wasting so much good wood...But we haven't got the machinery, we can't get the parts, and we're always having problems with maintenance...And it isn't easy to keep good workers when you can find them. These people never stick to anything for long. I suppose that comes from being a state of immigrants...

No, reforestation isn't my business. When I'm through, the landowner will go in there and burn the place over, then he'll turn it into pasture. He can't afford to even think of reforesting. ...It ought to be done. But it's not my job...

Not that the ranchers bothered when they came in and started clearing the land. Shameful the way they set fire to all that good timber. They say they lost hundreds of millions of dollars worth of wood on those ranches that the government backed with all that money...

Do you know who got the concession for clearing the timber at the Tucurui dam? The military gave it to those jokers from the Capemi...The Capemi boys couldn't get the timber out, so the electricity company went ahead and flooded the area anyway. Then they discovered that the trees were rotting and the turbines were rusting out. They had to send people in to cut the wood with underwater saws. (pages 21-33)

RIVER PEOPLE...people who aren't making the news but are living quietly as they have always lived...their ancestor have been living along these rivers for hundreds of years...these caboclos, forest people of mixed blood...they build their houses on stilts to keep them above the floodwater. They sleep in hammocks. They grow their food like the Indians-clearing little plots in the forest and burning the weeds. The Indians showed them how to grow manioc, which is the staple diet in these parts, and how to process it. They taught them how to use forest plants for food and medicine and how to hunt and fish...They live today pretty much like they always did. They're basically extractors. They grow subsistence crops on the varzeas-the floodplains-and they hunt and fish and sometimes tap rubber or collect other forest products, like copaiba oil. They'll take jobs if there's anything available. They'll go to the cassiterite mines, or try gold mining on the river, or work on the riverboats. Some of them become traders...They're real survivors...I'd say they tend to be pretty passive. Maybe that's the Indian in them...They don't seem to think much about the future and how they could change things...

The river people, like the Indians, have worst things to fear...they are threatened by poverty, disease, and by the influx of newcomers...they are not newsworthy. They do not have pop singers and human-rights activists fighting for them, as the Indians do. They are the forgotten people of the Amazon...

The main problem...pressure on the land..all these new people coming in-the settlers and miners, and the loggers, and the ranchers...It leads to overfishing, a shortage of game. And worse. There are a lot of changes in the river itself too, partly because of all the forest being cut. The whole pattern of flooding is changing, and since we grow most of our good on the floodplains, that's serious...and the gold miners. All that drilling in the riverbed is altering the navigation channels, and the mercury they use is poisoning the water and killing the fish... (pages 34-44)

MINERS...Ever since the days of the conquistadors, people have searched for El Dorado all over the Amazon...What lies there has value beyond imagining. It is enough to transform Brazil into one of the most powerful countries in the world.

Brazil is exploiting this unparalleled bonzana...granting concessions to big national and multinational mining companies...permitting the activities of large numbers of independent miners...

Chasing gold all over Brazil...It's a tough life, but after a bit it gets to you...Every time you think, well, I've just about had enough of this, something tells you there's a lucky streak just around the corner...

The riverbed has got layers of sand and shingle on top, and then gravel and clay...We've got to find out where the gold is and stay at that depth...The material we're drilling is mostly pebble and sand...It gets pumped up ...and sprayed out onto the top tank...it passes through sort of a sieve that catches the larger pebbles and rocks...runs down a slope that is covered with carpet and ridged with little wood baffles to catch the gold dust...The next stay is concentration...the mixture of sand and gold dust is hoisted off into a large barrel mixed with mercury...after that we do the refining...Now comes the tricky part. The toxic mixture of gold and mercury has to be separated...if any mercury did fall into the river-of course it wouldn't..

As for independent miners (garimpeiros), they participate in the largest business in the Amazon. Gold mining involves, at one time or another, probably half a million men-approximately a third of the working population in that region...Although the government may not like the idea, it is advantageous to permit the garimpeiros to operate; the garimpo provides a livelihood for large numbers of otherwise unemployed workers...they are highly mobile and extremely hard to control...most of their gold goes undeclared and therefore untaxed...they frequently invade Indian areas in pursuit of gold. Their presence is a missed blessing for the Indians. On one hand, they provide cash that can pay for demarcation of territory, planes, trucks, medical care, and a measure of financial independence...On the other hand, they cheat the Indians, introduce drugs and alcohol, and bring white man's diseases to which the Indians have no immunity... (pages 45-57)

RANCHERS...I suppose you're wondering what in the world made me come...We got a lot of help. The state couldn't do too much for us: interest-free-start-up loans, tax exemptions, you name it, we had it. All we had to do was start knocking the forest down...the land cost practically nothing...

You clear what you can first. Then you burn it, but it's got to be carefully controlled. After that you go ahead and plant the grass. Then it's time for the second burn-to keep the weeds under control. This one doesn't affect the grass seed, if you do it right...After the pasture is formed, all you have to do is keep it clean...the fertility in the soil is deceptive...after five or six years the pastures are pretty well shot....it's probably cheaper to clear new pasture at that stage, especially if you can get interest-free loans.

We did run into a bunch of troublemakers...we hadn't expected rubber tappers to gives us so much grief...they had land-use rights...there was lots of confusion over land titles...

The way in which the Brazilian government opened up the Amazon for development was...perfectly rational. At the time the forest was not seen as a rich resource but as an underutilized space that should be occupied. Here's how the strategy went: the government had a large area to develop...The government's first priority was the cattle ranchers, followed by agriculture and then industry. If it provided generous tax rebates and financial incentives, the ranches would underwrite the cost for the frontier development, create employment, and supply products for export...

...everyone discovered it's extremely difficult to set up a ranch in the Amazon. There's a constant battle with the jungle. Pastures deteriorate quickly, and stocking rates are low...the government has now withdrawn from the subsidy program and provides only minimal support for existing ranches....

Ecologists argue that ranching is an inefficient way of using the forest. They tell us that in order to make $1 million a year from cattle in Amazonia, you need to cut about thirty-eight square miles of forest; to make the equivalent money out of a good stand of timber, you need to cut less than one square miles; and out of mining a mere 0.006 square miles. (pages 76-87)

RUBBER TAPPERS...by 1875 there were 25,000 tappers working out of Belem...a terrible drought in the northeast, and thousands of people fled to the cities. So rubber tappers went in and signed up men as fast as they could. They offered to pay their fares and give them all the equipment they needed. What the men didn't realize was that they would have to pay off the debt in rubber, and they'd never clear it as long as they lived. They couldn't read or write you they were completely at the mercy of the bosses...the bosses were always short of men...they used to send in gangs to hunt down the Indians and force them into the labor pool...most of them died...either of bad treatment or the white man's diseases. We estimate seventy whole tribes were wiped out during that time...and lands were taken over by rubber bosses...

...the whole thing crashed when the British set up rubber plantations in Malaya, using seed smuggled from the Amazon...the bottom fell out of the Amazon rubber trade...but amazingly there came another boom...Second World War...then it slumped again...but the rubber tappers, of course, were still around...this didn't stop exploitation of the rubber tappers-this time it was by the traders...

People started getting shot...Chico Mendes died...he said it was up to us to stop the ranchers before they burnt the whole place down around our ears. He told us we'd better learn how to read so we could look out for ourselves, and he showed us that if we got together we could change things...when Chico died, people all over the world got to hear about us and our struggle...we're working in the forest here, and we need all the help we can get...tell people to support forest products, and to go on pressing for social justice...tell them not to forget us.

(pages 88-103)

ENVIRONMENTALISTS..."Is it because our worst fears about global warming may be coming true...once the forest is gone, it is gone forever...losing priceless biological resources...there are at least 1,400 rain forest plant species with potential medicinal value..."(page 2)

But the settlers...Most of them came from the south. They came here as pioneers. They saw forests as an enemy to be conquered. The loggers saw it as a resource to be mined. The ranchers saw it as an obstruction to be removed. We've got to get people to see it as a valuable resource, not as a damned nuisance. (p. 32)

Think reforestation, and you've got to think of Nick Burch...He's some crazy Englishman planting mahogany in Rondonia...He is not only reforesting his own land, but is also working with a group of settlers as well as the Surui [Indians]...Nick employs fifty people in nurseries...

[Nick] I'm interested in planting mixed stands of trees, including fruit trees and rubber..,I've planted over 200,000 seedlings, you know, from thirty species. What we have to figure out is how to make these forests too valuable to burn down...One of my ideas is to select a plot of land, say 250 acres, and contract with the landowner for fifty percent value of the commercial products produced over a period of, say thirty years. We'd do the reforesting and manage the place. I'd like to prove that properly harvested forest can yield far higher returns than land cleared for agriculture or raising cattle. You start with mixed agroforestry, including some subsistence crops, and as you go along you plant more valuable species so that the value of the land increases-instead of mining the land and leaving it fit for nothing. I'm working with the rubber tappers too on different small projects. Those involve proper management of rubber trees, something that's never done. And replanting, of course. Not only rubber trees but other things that you can harvest, like fruit trees and plants for oils and essences. (pages 24-27)

On all accounts, the garimpeiro (gold miner) is doing considerable damage to himself, to his environment, and to the people nearby. Most of the gold he produces will bypass the coffers of the government...the mixture of sand and gold dust is hosed off into a large barrel and mixed with mercury...Mercury can be poisonous in several ways. It can be absorbed through the skin. It can be ingested when mercury-laden dust lands on food or utensils or by eating contaminated fish. Even very small amounts can cause chronic poisoning, since mercury penetrates the nervous system, where it accumulates. (page 53)

...the work of Professor Samuel Benchimel...his theory is that sustainable development has to be based on three things: it has to be economically sound, ecologically balanced, and socially just...we realized that we needed much more information about the different ecosystems...we needed to get some zoning done so that we could see how to make the best possible use of the land...

...our development plan is called Planaforo...we've divided the state (Rondonia) into six zones...zone 1 is improved agricultural production...zone 2 concentrates on agroforestry, planting rubber and coffee together, for example...zone 3 is the riverine zone...we'll concentrate on technical assistance with agriculture and fishing and help with credits and cooperatives ...zone 4 is the extractive zone...setting up extractive reserves where we'll step up rubber production and other forest products...zone 5 is the managed forest with a model for sustainable forestry where we'll work on way of protecting the forest, managing it, and marketing the lumber...zone 6 is the area of permanent preservation ...biological reserves, protecting Indian lands...producing seedlings, researching sustainable forestry, monitoring environmental pollution, protecting watersheds, and setting up ecotourism... (pages 73-75)

TABLE 14 WHAT NEXT? (from Voices from the Amazon,pages 130-143)

Things didn't seem so black and white anymore. The forest people wanted one thing and the outsiders wanted exactly the opposite. Was there any way of bringing change and bettering people's lives without bringing devastation?

In December 1991, The Economist published the following information on the cost of various means of preventing one ton of carbon dioxide from entering the atmosphere:

- *Control deforestation in the Amazon - $4
- *Cut U.S. emissions by 10 percent (cars, factories) - $10
- *Reforest Amazonia - $30
- *Cut U.S. emissions by 50 percent - $130

UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED)

- *called the Earth Summit
- *held in Rio Janeiro in June 1992
- *only one world...care and share...the future is in our hands
- *two wishes: live happy and meaningful lives in dignity and sufficiency...live in harmony with nature
- *subjects discussed: poverty, protecting the atmosphere, climate change and energy use, desertification, forests, sustainable agriculture, biodiversity and biotechnology, water supplies, toxic chemicals, hazardous waste, oceans, fresh water, environmental education, technology transfer, indigenous people, women and youth, sustainable development
- *the problem...it's hard to deal with poverty on one side and overconsumption on the other side
- *five documents were adopted by the governments at the Earth Summit...The Rio Declaration, Agenda 21, The Climate Convention, The Biodiversity Convention, and the Statement of Forest Principles (pages 139-141)

DOCUMENTS ADOPTED AT THE EARTH SUMMIT

(*Voices from the Amazon*, pages 140-141)

- **The Rio Declaration** stated the basic principles that people are central to sustainable development, that states hold sovereign rights over their natural resources, and that the rate of development must not exceed the capacity of the earth to renew itself, nor prejudice its future capacity to do so. It also stated that Southern countries should have priority in development, that all countries should cooperate to share knowledge and technology, and that polluters should pay the cost of cleaning up.

- **Agenda 21** provides a blueprint for action in all areas relating to sustainable development from now into the twenty-first century. "Humanity stands at a defining moment in its history. We can continue with present policies that are perpetuating the economic gap within and between countries, increasing poverty, hunger, sickness and illiteracy worldwide, and causing the continued deterioration of the ecosystems on which we depend to sustain life on earth. Or we can change course, bringing improved living standards to all, better protected and managed ecosystems, and a safer, more prosperous future. No nation can achieve this on its own. Together we can, in a global partnership for sustainable development."

- **The Climate Convention** came to general agreements on reducing carbon emissions, but stopped short of setting levels and timetables.

- **The Biodiversity Convention** (christened by one weary delegate the Mother of All Conventions) discussed ways to preserve the richness of life, its ecosystems, species, and genetic diversities. It also took up the thorny issues of biotechnology, intellectual property rights, patenting of life forms, and possible consequences of genetic engineering.

- **The Statement of Forest Principles** asserts that nations have sovereign rights to exploit their forests, but that they should use proper management techniques. Large sums of money will be made available for conservation and reforestry.

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TABLE 15 'CURITIBA: A MODEL CITY"

(article from The Brasilians)

While many other South American cities struggle with garbage and gridlock, Curitiba's 1.7 million residents ride new buses, enjoy pristine parkland and recycle their trash.

Its success has attracted attention from as far away as Shanghai and Seattle.

Even planners and urban environmentalists from rich nations visit Curitiba to to study its approaches to transportation, waste disposal and inner city renewal.

How could such a model city emerge in a nation stricken by recession and urban blight?

"The solution is always in simplicity," said Jaime Lerner, who is in his third term as mayor and leads a group of architects who laid out the city development plan 25 years ago.

His answer is important to a continent where rapid growth is shifting from the largest cities to such medium-sized ones as Curitiba, which lies in the industrial and agricultural heartland 250 miles southwest of São Paulo.

Some nearby cities are growing so rapidly, according to news reports, that they use police roadblocks to turn migrants back to the highways.

Lerner rejects costly, complex public projects – "Someone is always trying to sell you grand solutions" – in favor of more modest, efficent plans better suited to his city.

He scorns expressways and other concessions to the automobile, choosing pedestrian malls and an all-night complex of shops and cafes in the heart of Curitiba.

"The less importance you give to cars, the better a city is for people," he said.

As he and his fellow planners won public support in the late 1960s and early 1970s, they created a self-financing bus system that made big highway projects or a subway unnecessary. Daily ridership has grown from 25,000 in 1974 to 1.3 million.

Passengers step up into tube-shaped, plexiglass stations to buy tickets and wait for buses, enabling them to board and leave more quickly.

Curitiba began its waste recycling program in the schools, teaching children that "they are helping to save 1,200 trees a day" by separating trash.

"The children taught their parents," Lerner said.

Seventy percent of households now recycle, including slum dwellers, who are allowed to exchange trash for food. Per capita energy use is about 25 percent below the national average.

Because of an energetic parks program, Curitiba has sixty five (65) square yards of green space per resident, a 100-fold increase in twenty (20) years.

It has a botanical garden, where slum children are given jobs planting flowers, and a small, exquisite opera house built of steel and glass in an abandoned granite quarry. In another quarry, there is an institute for the study of urban environment.

José Carreras, the Spanish tenor, recently performed in the opera house. Some of the tickets were offered in exchange for trash.

"What's the difference here?," Lerner said.

"People feel respected. There is no will for change when people don't feel respected." (AP- KN)

New Ideas for Old Urban Problems

According to *The New York Times* when James Lerner began to speak at the McCormick Place in Chicago for more than 6000 architects "all the noise suddenly seemed worth it".

Mr. Lerner, 55, is a former mayor of Curitiba. "the ecological capital" of Brazil, a city with a population of 1.5 million people that is considered a model and an inspiration for cities around the world like Chatanooga. Vancouver, Halifax . Santiago de Chile in Latin America as well as Lyon in France.

The former mayor of Curitiba, Mr. Jaime Lerner- a Brazilian architect and urbanist on June 20th was honored by the American Institute of Architects with the title of American Architect.

Mr. Lerner spoke to more than 5,000 people during the IULA 93 - International Union of Local Authorities in Toronto and in Chicago at the AIA - Architects Institute of America conference whose theme was Crossroads 93 "Strategies for Sustainable Design".

According to Mr. Lerner "a city can save a country". Through new and innovative ecological solutions, Curitiba, capital of the State of Paraná, in the south of Brazil is teaching the first world a lesson in dealing with old problems such as poverty, education, pollution, transportation and recycling. In no other city in the world does the municipal government buy garbage from the people. Mr. Lerner, with the example of his hometown, Curitiba, is the type of leader called for by the Earth Summit 92 in Rio. Surveys in Brazil show Jaime Lerner is the political figure with the most credibility among businessmen and professionals. He would be a strong candidate for President in the 1994 Brazilian elections. Through new and innovative ecological solutions, Curitiba, Capital of the State of Parana in Brazil is teaching the first world a lesson in dealing with old problems such as poverty, pollution, education, transportation and recycling. In no other city in the world does the municipal government buy garbage from the people.

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TABLE 16 POLONOROESTE, A DEVELOPMENT PROGRAM

(The Rainforest Book, pages 54-55)

- 1/3 of world's remaining tropical rainforest is in Brazil, most of it in the Amazon Basin
- an example of international funding from the World Bank and International Monetary Fund causing deforestation
- Polonoroeste
  - highway and resettlement program in Rondonia and Matto Grosso
  - purpose: alleviate overcrowding in southern Brazil
  - its centerpiece is a highway, BR-364
  - led to Rondonia being the area with the most rapid deforestation in Brazil
  - 20% of its rainforest is gone; at the present rate of destruction, the rest will be gone in 25 years
  - before 1970, mostly undeveloped and inaccessible
  - Rondonia's population doubled in 1980
  - colonists became slash-and-burn farmers...but poor soil... forced to sell their land to speculators
  - poor healthcare and little schooling

TABLE 17 POLONOROESTE, A DEVELOPMENT PROGRAM

(The Decade of Destruction)

The main part of the loan -$240 - was for the paving of BR 364 highway, which runs from the south of Brazil into the Amazonia states of Mato Gross and Rondonia. This was the direct road originally commissioned by Jusecelino Kubitschek, the President who built Brasilia and launched Brazil's north and westward thrust into the Amazon. Now with every rainy season, thousands of trucks were marooned for days in a sea of mud, with their produce rotting in the heat. This proposal was to facilitate access of agricultural surpluses to markets. A further $200 million of the World Bank's money was to be for feeder roads, health programs, and rural development.

From the inception, the loan attracted violent opposition. Survival International knew that adequate protection for the 8,000 Indians in the area had not been determined. A number of Indians in the area were still isolated and had not been in permanent contact with the national society. Critics objected to the fact that the loan brought paving forward before there was sufficient machinery to protect the Indians or the environment from the development it would cause.

The Polonoroeste loan made more provision than any previous loan for interests of the tribal people in the area. Over $10 million was allocated for Amerindian affairs, but the Indian Agency (FUNAI) spent much of the money on jeeps, tractors, airplanes, schools, and hospitals without resolving the fundamental problem: Indian survival in the face for colonization and development.

On December 15, 1981, the loan agreement was signed. On September 13, 1984, the road was inaugurated. On September 19, 1984, Congressional hearings were already being held about the devastation it was causing. In the spring of 1985, Congressional criticism forced the World Bank to suspend, temporarily, its payments on the Polonoroeste loan.

When Rondonia was elevated to statehood in 1982, the governor appealed to the people of Brazil: "Come Brazilians from all over Brazil. Come, men of all peoples. Rondonia offers you work, solidarity, and respect. Bring us your hopes and dreams." Four years later, in 1986, the governor complained: "Rondonia is being trampled down by a migration of 180,000 people per year. The great problem Rondonia faces today is the devastation of our state." As soon as the road was rumored, people scrambled to mark out a patch of land before the Land Agency's surveyors had arrived.

Some interesting statistical date:

*At the start of the decade, only two percent of the state was deforested. At the end of the decade, a fourth had been consumed.
*Sixty percent of the deforested area is now scrub on its way back to secondary forest.
*After Brazil's biggest agricultural colonization program, three-quarters of the population lives in towns-much of it slums

Barber Conable, President of the World Bank, shared these general thoughts on May 5, 1987:

*the bank misread the human, institutional and physical realities of the jungle and the frontier
*a road which benefitted farmers also became a highway for logging companies
*protective measures to shelter the fragile land and tribal people were carefully planned but poorly executed
*the dynamics of frontier got out of control
*ambitious environmental design requires realistic analysis of the enforcement mechanisms in place and prospect

TABLE 18 US AND FOREIGN ORGANIZATIONS INVOLVED IN SAVING THE TROPICAL RAIN FORESTS

(from The Rainforest Book, pages 109-111)

U.S. organizations involved in saving tropical rainforests

Conservation International, 1015 18th St., NW, Suite 1002, Washington, DC 20036.

Cultural Survival, 11 Divinity Ave., Cambridge, MA 02138.

Environmental Defense Fund, 1616 P St., NW, Suite 150, Washington, DC 20036.

Friends of the Earth/U.S., 218 D St., SE, Washington, DC 20003.

Global Tomorrow Coalition, 1325 G St., NW, Suite 915, Washington, DC 20005.

Greenpeace, 1436 U St., NW, Washington, DC 20009.

International Planned Parenthood Federation, 902 Broadway, 10th Floor, New York, NY 10010.

National Audubon Society, 645 Pennsylvania Ave., SE, Washington, DC 20003.

National Museum of Natural History/Smithsonian Institution, Washington, DC 20008.

National Wildlife Federation, 1400 16th St., NW, Washington, DC 20036.

National Zoological Park/Smithsonian Institution, Washington, DC 20008.

Natural Resources Defense Council, 40 W. 20th St., New York, NY 10011.

The Nature Conservancy, 1800 North Kent St., Arlington, VA 22209.

Pele Defense Fund, P.O. Box 404, Volcano, HI 96875.

Population Crisis Committee, 1120 19th St., NW, Suite 550, Washington, DC 20036.

Rainforest Action Network, 301 Broadway, Suite A, San Francisco, CA 94133.

Rainforest Alliance, 270 Lafayette St., Suite 512, New York, NY 10012.

The Rainforest Foundation, Inc., 1776 Broadway, 14th Floor, New York, NY 10019.

ierra Club, 730 Polk St., San Francisco, CA 94109.

mithsonian Tropical Research Institute, APO Miami, FL 4002

urvival International USA, 2121 Decatur Place, NW, Washington, DC 20008.

World Resources Institute, 1735 New York Ave., NW, Washington, DC 20006.

World Wildlife Fund/Conservation Foundation, 1250 24th t., NW, Washington, DC 20037.

ero Population Growth Inc., 1400 10th St., NW, Suite 320, Washington, DC 20036.

Foreign organizations involved in saving rainforests

Campa a Amazonia: Por la Vida, P.O. Box 246C, Quito, Ecuador.

COICA (Coordinating Body for the Indigenous Peoples' Organizations of the Amazon Basin), Jiron Almagro 614, Lima 11, Peru.

Environmental Foundation Ltd., 6 Boyd Place, Colombo 3, Sri Lanka.

Friends of the Earth/U.K., 2628 Underwood St., London N17JU, United Kingdom.

Haribon Foundation, Suite 306, Sunrise Condo, Ortegas Ave., San Juan, Metro Manila, Philippines.

Indonesian Environmental Forum (WALHI), Jl. Penjernihan I, Kompl. Kenangan 15, Pejompongan, Jakarta 10210, Indonesia.

International Union for the Conservation of Nature and Natural Resources, Avenue Mont Blanc, 1196 Gland, Switzerland.

Probe International, 225 Brunswick Ave., Toronto, Ontario M5S 2M6, Canada.

Research Institute for Natural Resource Policy, 105 Rajpur Rd., Dehra Dun, Uttar Pradesh 248001, India.

World Rainforest Movement, 87 Contonment Road, 10250 Penang, Malaysia.

World Wildlife Fund/U.K., Panda House, Godalming, Surrey, GU7 1XR, United Kingdom.

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TABLE 19 STUDENT ENVIRONMENTAL NETWORKS AND ORGANIZATIONS

(from the Colorado Division of Wildlife, June 1994)

1. CHILDREN'S ALLIANCE FOR PROTECTION OF THE ENVIRONMENT
CAPE
PO Box 307
Austin, TX 78767
(512) 476-2273

2. EARTH KIDS ORGANIZATION(EKO) & ACTION! SAVE A PLANET (ASAP)
PO Box 3847
Salem, OR 97302
(503) 363-1896

3. FRIENDS OF THE EARTH
218 D Street, SE
Washington, DC 20003
(202)-544-2600

4. KIDS AGAINST POLLUTION
KAP
PO Box 775
Closter, NJ 07624
(201)-784-0668

5. KIDS FOR SAVING EARTH (KSE)
PO Box 47247
Plymouth, MN 55447-0247
(621)-525-0002

6. KIDS SAVE THE PLANET (KIDS S.T.O.P.)
PO Box 471
Forest Hills, NY 11375

7. SAVE WHAT'S LEFT
7201 W. Sample Road
Coral Springs, FL 33065
(305)- 344-3412

8. STUDENT ENVIRONMENTAL ACTION COALITION (SEAC)
PO Box 1168
Chapel Hill, NC 27514
(919) 967-4600

9. THE CHILDREN'S RAINFOREST
PO Box 936
Lewiston, ME 04240

(207) 784-1069

10. GLOBAL KIDZ
4880 Lower Roswell Road
Suite 630
Marietta, GA 30067
(404) 992-1062

11. CHILDREN OF THE GREEN EARTH
Michael Soule
Box 95219
Seattle, WA 98145
(503) 229-4721

12. KIDS FOR A CLEAN ENVIRONMENT (KID'S FACE)
PO Box 158254
Nashville, TN 37215
(615) 331-7381

13. YOUTH FOR ENVIRONMENTAL SANITY (YES!)
706 Frederick Street
Santa Cruz, CA 95065
(408) 459-9344

14. GLOBAL YOUTH NETWORK
H. Frank Carey High School
230 Poppy Avenue
Franklin Square, NY 11010

15. YOUNG ENVIRONMENTALIST'S ACTION NETWORK
PO Box 7490
Boulder, CO 80806

TABLE 20 CHICO MENDES (The Rainforest Book, pages 48-50)

*born December 15, 1944
*grew up among rubber tappers
*1969 Brazil started its National Integration Program
*a costly road-building and colonization program
*huge incentives were offered to relocate millions of poor people from the more populated eastern region
*to attract large investors to establish cattle ranches
*rubber tappers forced to relocate
*Chico plans nonviolent blockades...200+ families that block bulldozers coming to clear the forest...in 13 years, he organized 45 blockades..saving close to 3 million acres of forest
*Chico sets up the Rural Workers' Union
*Chico favored "extractive reserves" for sustainable use by rubber tappers and gatherers of fruits, nuts, and fibers
*one of the reserves (Seringal Cachoeira) he helped establish was on land claimed by Darli Alves, a local rancher
*December 1988, Chico is killed by Darci Alves, the 21-year-old son of the rancher
*The Chico Mendes Fund, Environmental Defense Fund
257 Park Avenue South
New York, NY 10010

TABLE 21 DEBT-FOR-NATURE-SWAPS

(The Rainforest Book, page 70-71)

*developing countries often sell off their timber and convert rainforest to cattle pasture to raise money to pay off their foreign debt
*groups like Conservation International and The Nature Conservancy
*purchase debts owned by rainforest countries to other nations and banks
*they buy debts at heavily discounted prices
*in exchange for a promise from the debtor country to set aside rainforest as natural reserve, the group holding the debt forgives the obligation
*Conservation International bought $650,000 of Bolivia's for $100,000 and Bolivia agreed to protect almost 6,000 square miles of rainforest
*a few drawbacks...inflationary impact on economies of developing countries, erosion of political sovereignty, and questionable enforceability

TABLE 22 CAN THE INDIANS REALLY BE SAVED?

(from The Decade of Destruction, pages 72-75)

Living in the peace of the government-maintained National Park of Xingu, it was easy for people to forget the Upper Xingu had once been a cauldron of invading tribes. Most had withdrawn from the advancing whiteman.

The paradox of Xingu was that it needed a crusader's determination to hold off the predators of civilization long enough to give the Indians time to adapt; at the same time, it needed the gentleness of touch to help the Indians adapt without crushing them. How can you attempt to save the Indian, if one of the things you have to save him from is himself?

Animals can be saved from extinction because they are content to remain animals. But all humans recognize improvement, and desire the advantages of other men. As soon as there's a shop near here, the Indians will load their canoes with goods and come to the shop. After twenty trips they will buy an outboard motor and make their business more efficient. It will be the Indians themselves who will break the isolation of the national park and destroy their tribal society. In this sense, how can the Indians be saved from extinction?

TABLE 23 WHAT CAN PEOPLE OF THE AMAZON DO?

(from Voices from the Amazon, pages 130-135)

INDIANS

*work for demarcation and protection of their lands
*decide which aspects of the white man's world they wish to adopt

LOGGERS

*start sustainable forest industries
*do careful evaluation of road-building programs
*have serious stumpage fees
*do vigorous program of enrichment planting
*set up small-scale manufacturing

RANCHERS

*start reforesting
*plant industrial forests
(provide wood for construction, charcoal, pulp, and fuel)
*do agroforestry...combining forestry and pasture, in rotation of woodland crops, in nurseries for reforestry and enrichment planting, and in the creation of germ banks
*prohibit any new cattle projects

FOREST PEOPLE/RIVER PEOPLE

*make sustainable use of the areas
*build septic tanks
*provide water filters
*increase food production on floodplains with help from agricultural technicians
*try fish farming and farming other animals

GOLD MINERS

*create garimpo reserves...health services, technical assistance, improved security
*work for a company

RUBBER TAPPERS

*live on extractive reserves
*set up cooperatives for marketing
*become more involved in processing
*process other forest products

SETTLERS

*increase production with technical assistance
*maintain roads
*grow food for local use
*try agroforestry, fish raising, and small-scale livestock production

TABLE 24 TRUE/FALSE QUIZ - AMAZON ECOLOGY

1. The Amazon rainforest existed in a pristine, undisturbed condition for millions of year prior to the recent wave to deforestation.

2. The rainforest is immune to fire.

3. Most nutrients in the Amazon ecosystem are located in the biomass and not in the soil as is the case in temperate ecosystems.

4. Once the rainforests are cut down and burned, a forest will never regrow on the land!

5. Amazon deforestation is occurring everywhere throughout the basin.

6. Almost all cattle ranches in Amazonia are financed, at least in part, by the federal government and almost all have been unsuccessful.

7. With the failure of the Trans-Amazon colonization scheme, agricultural settlement of the Amazon basin has slowed considerably.

8. Forest logging is a relatively minor activity in Amazonia and as currently practiced constitutes a sustainable approach to forest use.

(All answers to the true/false quiz are false.)

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BAHIAN BABBLING ABOUT BRAZIL:

A CURRICULUM UNIT ON "BRAZIL AND BIODIVERSITY"

Project Report
Fulbright-Hays Seminar Abroad Program
"Environmental Issues in Brazilian Society"

Curtis L. Thompson

Thiel College
Greenville, PA 16125

November 17, 1994

BAHIAN BABBLING ABOUT BRAZIL:
A CURRICULUM UNIT ON "BRAZIL AND BIODIVERSITY"

Prologue: Babbling

I do not dare to set forth my Fulbright-Hays Seminar Abroad Program project report without a text. In fact, I have got two of them. The first one is from the Older Testament, Genesis 11:1-9. Those verses tell the story of the Tower of Babel. We read there how God observes the accomplishments humans have been able to pull off because of their common language. So God decides to confuse their language, so they will not be able to understand one another. God scatters the people over the face of all the earth, and they quit building the city that came to be called Babel because of their babbling.

Confusion continues to this day when one does not know a language. I had the good fortune to travel to Brazil, around Brazil, and back home (20,000 miles in all) this summer along with fourteen other people from the United States. Our mission was to study "Environmental Issues in Brazilian Society." We had an incredible thirty-six-day trip. And I am pleased to offer a report on the curriculum unit that benefitted greatly from my experience in Brazil. But the title for my little project report includes a warning. What I have been able to communicate to others about Brazil is clearly "babbling." I did not know the language; therefore, I did not have access to layers upon layers of meaning of the Brazilian culture.

So what I am up to here in this report is the same as what I was up to in team-teaching the unit on "Brazil and Biodiversity": "Babbling About Brazil."

I. The Broader Context:
"Science and Our Global Heritage I & II"

The curriculum unit "Brazil and Biodiversity" finds its broader context in the course

"Science and Our Global Heritage I & II" that has been developed at Thiel College in western Pennsylvania. Thiel had in place a year-long, multi-disciplinary course in the history of Western humanities taken by all first-year students. It needed a comparable course that would deal with cultures outside of the "Western" tradition and that would look at some of the tough problems plaguing the Two-Thirds World. Thiel also needed to develop a general introductory science course that would be team-taught by representatives of the various natural sciences, for an effort toward that end had been tried to no avail because the scientists involved were unable to come to agreement in designing the course. Those two needs--for a non-Western course and for a general science course--were met when a team of Thiel faculty members from the humanities, the social sciences, and the natural sciences together developed the idea of a team-taught course examining global issues in relation to particular geographical locales. We fleshed out our idea for this course in the context of writing a grant proposal. On our second try, Thiel College was awarded in the fall of 1993 a Leadership Opportunity in Science and Humanities Education grant. These federal grants are sponsored jointly by the National Endowment for the Humanities, the National Science Foundation, and the Fund for the Improvement of Post-Secondary Education. Our project was entitled "Global Heritage: Multidisciplinary Perspectives on Sustainable Development." The primary purpose of the Global Heritage Project was to develop the course "Science and Our Global Heritage I & II." This is a multi-disciplinary, laboratory-centered, year-long or two-semester, sophomore-level course that brings together the humanities, the natural sciences, and the social sciences in a study both of environmental issues and of other cultures under the theme of sustainable development.

Concerning the general characteristics of the course, it can be said that the discipline of Environmental Science provides the backbone of the Global Heritage course, but all of the

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natural sciences contribute at one point or another. The global issues that we settled on for the course are biodiversity, food, industrialization, and natural resources. The particular geographical locales that we chose are Brazil, India, China, and Nigeria. And the conceptual thread running throughout the course and tying it together is that of sustainable development.

The general objectives of the course are: to heighten global awareness; to develop an appreciation for global diversity and the interrelatedness of knowledge; to engender the value of sustaining our global heritage; and to foster an understanding of how science relates to society's problems. The specific objectives of the course are: to consider ethically the converging crises of the 21st century; to study how four diverse cultures experience and express reality; to increase consciousness of issues of race, class, and gender; to investigate the concepts of "sustainable development" and "progress"; and to examine the scientific basis for understanding global crises and solutions. "Sustainable development" has become a buzz word or buzz phrase and thus a Tower of Babel of sorts what with all the confusion and babbling that has gone on trying to define it. So I include here a workable definition from Our Common Future, the Report of the World Commission on Environment and Development set up by the United Nations. Sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[1] To think about development as sustainable is to think about issues of the environemnt and equity in addition to economic concerns.

We selected the four global issues, of course, in relation to the four particular geographical locale. Therefore, the four central units of the course, each five weeks in length, are:

---

[1] Our Common Future: World Commission on Environment and Development (Oxford: Oxford University, 1987), p. 35.

Unit 2: Brazil and Biodiversity
Unit 3: India and Food
Unit 4: China and Industrialization
Unit 5: Nigeria and Natural Resources

Two other four-week units round out the course. The first is an introductory unit on "Approaching Our Global Heritage" in which we introduce the concept of sustainable development, the thread running through the whole course, as well as some basic distinctions and method issues. And the other is the closing unit on "Converging Crises of the 21st Century," where we take a step back and attempt to look at the big picture and the interrelatedness of the issues.

Some special features of the course include framing narratives which are novels from the geographical locales that are being studied. The hope is that these novels will put a human face on the culture we are studying and provide us with images that can be used throughout the unit. We are making use of many videos throughout the course; our grant enabled the purchase of some great videos and of films for each unit. We show a film every Monday evening; students must attend write a little reflection paper on at least one of these per unit and they receive extra-credit for doing more than one. We are working hard to use multi-media in our lectures. One class session last week in our "India and Food" unit, we made use of music from India, transparencies on an overhead, a video, and while the lecture on "Soil and Food Production" was going on our Sociologist was cooking an Indian dish he called "Curry in a Hurry" on a campstove, and the class ate that over rice at the end of the period. We have worked field trips into the course. The students turn in a reflective journal entry every week. There is an activity component, for which the students receive points. Last weekend a group of them went to help a project in sustainability raise a building, and another group is working on a community composting project. And finally, we have regular Ilo meetings. In the Ibo tribe in Nigeria the Ilo is the village meeting where decisions are made. The students had input on some of the policies of the course and they give us feedback on how things are going in the Ilo sessions.

The course was scheduled to include two one-hour lecture-sessions, one one-hour discussion-session, and one three-hour laboratory-session each week. This year we have the luxury of learning from a pilot-run of the course with only twenty students in it. Next year the whole sophomore class will be taking two semesters of "Science and Our Global Heritage."

The grant we received is funding a three-year project. The pilot-run of the course that we are currently in is the second year of the grant. The first year was devoted to doing preparatory work, to getting ready to teach the course. At the heart of the research, development, and design that was done during that first year was the Teaching Team, the eight key faculty members who are now teaching the course. Teaching Team members come from the disciplines of Environmental Science, Physics, Chemistry, two from Biology, Sociology, English, and Religion. This year we have had the good fortune of being joined by a visiting scholar from India whose area is Literature. In addition to the Teaching Team, sixteen other Thiel faculty members participated a little less intensely in the project as Research Associates. The idea here was to have a pool of people who would have gained enough exposure to global issues and to our geographical locales to feel comfortable to rotate into the course. From the natural sciences, we had associates from Physics, Chemistry, two from Biology, Geology, two from Mathematics, and Computer Science. Research Associates from the social sciences were from Psychology, Political Science, Education, and Nursing. Finally, from the humanities, faculty from the disciplines of history, languages, and two from English rounded out this second layer of participating scholars.

Faculty members teaching the "Science and Our Global Heritage I & II" course include the following:

Dr. Guru Rattan Kaur Khalsa, Chemistry Department, AC 107, Ext. 2049
Dr. Michael Bacon, Physics Department (Fall Semester), S 11, Ext. 2105
Dr. Henry Barton, Environmental Sciences Department, AC 06, Ext. 2233
Dr. Joyce Cuff, Biology Department, AC 207, Ext. 2066
Dr. Nicholas Despo, Biology Department, AC 208, Ext. 2067
Dr. Alan Hunchuk, Sociology Department, S 103-B, Ext. 2087
Dr. Bonnie MacLean, Biology Department (Spring Semester), S212, Ext. 2114
Dr. Christopher Moinet, English Department, G 303, Ext. 2157
Dr. Ramanujam Nedumaran, Visiting Scholar, India
Dr. Curtis Thompson, Religion Department, G 309, Ext. 2106

A word should maybe also be offered on teaching methods and evaluation procedures for the course. Teaching methods will consist of plenary lectures, small-group discussions, laboratory experiences, field trips, and films. Evaluation of students will be based on the following: **Unit tests - 300 points**. There will be three unit tests worth 100 points each. The test will be approximately 1/3 objective and 2/3 essay questions. **Quizzes - 100 points.** Brief (5-10 minute) quizzes will be given at times indicated in the syllabus. They will generally occur during weeks in which there are no major tests. They will test the students' understanding of material covered in recent lecture and lab sessions. **Final exam - 100 points.** The final exam will be in the form of a take-home exam distributed at the beginning of the semester. The student will be expected to incorporate insights and information from the course into reflective essays written in response to the questions (essays should each be no longer than two-typed pages in length). **Participation - 150 points.** Students will be assessed in terms of the quality of their participation in all of the activities of the course. **Activity - 50 points.** During the first discussion session of the course, students will identify one or more activities to which the group will be committed during the semester. Each student will have specific tasks for which he or she is responsible relative to the group project. Point allocations will be made on the basis of completion of these tasks. **Lab and Course Journal - 300 points. The Course Journal** - Each week the student will submit a journal entry which is to be no less than one typed page in length. It should contain the student's reflection on the course during that week including reactions to lectures, discussions, videos, field trips or other course related experiences. **Lab Journal** - As part of the journal entry, students should include a separate description of their lab experience which includes a brief description of what was done, why it was done, what results were obtained (if applicable), what the experience meant to the student, and how the experience relates to the global heritage theme. During some weeks the students will be asked to respond to specific lab related questions in addition to this general response. **Film Reflection** - Each Monday during the semester there will be a film shown in Bly Lecture Hall. These films focus on the issues and countries studied in this course. Students will be required to view one film for each unit and to generate a separate reflection, one typed page in length, for each of the three films selected. **Glossary - 100 point option.** Students will be given the option of generating a glossary of 150 terms in place of one of the three unit tests. This option will be described during the first discussion session of the semester.

The central texts for the course are: *Environmental Science: Action for a Sustainable Future* (Daniel D. Chiras, Fourth edition, 1994) and the accompanying Lab Manual. Fall, Spring *Ancient Futures: Learning from the Ladakh* by Helena Norberg-Hodge. *The Storyteller* by Mario Vargas Llosa. *Nectar in a Sieve* by Kamela Markandaya. *Wild Swans: Three Daughters of China* by Jung Chang. *Things Fall Apart* by Chinua Achebe. *Global 2000 Revisited* by Gerald O. Barney. Supplemental readings are also being used.

A final, more personal word about the course is in order. As a teacher of religion, I can point out that in this course, from one point of view, there is not all that much explicit attention given to religion. But from another point of view, religion is being dealt with throughout the unit. If one sees religion as a dimension of culture, then in untangling the fabric of the culture one will be learning about the religious threads running throughout it.

In the church civilization of the Middle Ages religion was authoritative, highly valued, at the center of cultural life. Theology was the queen of the sciences. With the Enlightenment and the rise of modernity, things have changed. Religion and theology are now at the fringes. Teaching in this marginalized discipline, as intellectuals without any authority, has its drawbacks and frustrations as we all know. That is why it is so pleasant to be "teaching religion amidst the sciences." For in that setting one gets to wear a lab coat. And with that scientific adornment the religious studies scholar regains the authority that she so longingly desires and so rightfully deserves.

II. An Overview of the Curriculum Unit

To convey a sense for how the unit "Brazil and Biodiversity" flows, the following general overview is provided. The unit begins with the framing narrative which in this case is Mario Vargas Llosa's The Storyteller. The first lab is a field trip to the Brucker Great Blue Heron Sanctuary of Thiel College which is about three miles from the campus. The first lecture introduces the students to Brazil as a geographical locale. The first discussion session is a case study on the merits of preserving a particular species over against building a dam in the name of progress. The unit's first film is the German classic "Aguirre: Wrath of God," filmed in the Amazon.

The second lecture introduces the students to the global issue which in this case is "Biodiversity." The second lab is on "Habitat and Niche," in which students study part of the campus forest preserves. The third lecture provides an overview of five-hundred years of

Brazilian history in terms of the interplay of colonial and economic forces. The second discussion-session is a case study on liberation theology.

Lecture number four is on "Religion in Brazil: From Civil Religion to Liberation Theology." This is followed by a discussion of "Base Communities as Model for American Religion?" The second film is "The Green Wall," a Peruvian movie telling about the hassles a family goes through to leave Lima and homestead a plot of land in the Amazon rain forest. The third lab is a field trip to Cleveland Zoo's tropical rain forest exhibition.

"The Dislocation of Ethnic Identity and the Eclipse of the Rain Forest: The Politics of Nationalism," the fifth lecture, focusses on the indigenous Indians of Brazil. Next is a video, "Our Disappearing Forest," followed by a discussion-session that considers various pressures impinging on the Brazilian situation and various options that they nevertheless have. The third film is "Black Orpheus" which communicates a sense of the importance of Carnival for Brazilians. The sixth lecture is a "Magical Mystery Tour" of the "Literature in Brazil."

The simulation game Stratagem is played in the fourth laboratory-session. In this game students assume the role of political ministers of a country, with the goal of making national decisions that will move the country toward a more sustainable level of existence and mode of operation. "The Symbolism of Samba: Music in Brazil" is the seventh lecture." The discussion-session for the week centers on the question of "The Utility or Non-Utility of Art." "Bye Bye Brazil," the fourth film of the unit, follows a team of performers as they make their way to various corners of Brazil. The unit's last lecture looks at some of the positive environmental initiatives that Brazil has taken in response to the global issue of biodiversity. And in the final lab students watch the film "Medicine Man" and then discuss it.

While in Brazil this summer on the Fulbright-Hays Seminar Abroad Program, I took fifteen-hundred slides and just about every one of them turned out. Therefore, in teaching this curriculum unit, we made extensive use of the slides. We were able to incorporate about six hundred of my slides into our various lectures.

III. A More Detailed Outline of the Curriculum Unit

UNIT 2: BRAZIL AND BIODIVERSITY (In this more detailed outline I have not included the elaborate details of the laboratory sessions.)

FRAMING NARRATIVE: Mario Vargas Llosa's *The Storyteller*. Due 10/6

9/27- Tuesday
Reading - "A Country Profile: Brazil"
Laboratory - **Brucker Great Blue Heron Sanctuary of Thiel College**.
Students will visit the sanctuary to identify and begin to appreciate what is involved in protecting an endangered organism.

9/29- Thursday
Lecture - Where is Brazil Today? In South America, in Poverty, in Turmoil

I. Ten Major Geographic Qualities
  A. Territorially
  B. Physiographic diversity
  C. Population
  D. Uneven development
  E. Forward capital
  F. National culture
  G. "Take-off" economy
  H. Population growth
  I. Core area dominating
  J. Regional isolation

II. The Regions of Brazil
  A. Sao Paulo
  B. The South
  C. The Southeast
  D. The Northeast
  E. The Central West or Interior
  F. The Amazonian North

III. Populations Patterns
  A. Diversity
  B. Immigration

  - C. Growth rate

- IV. Development Problems
  - A. Uneven development
    - 1. Coastal
    - 2. Urban
    - 3. Wealth
    - 4. Debt
  - B. Modern industrial revolution
    - 1. Strong sense of national unity
    - 2. Beginning of a diversified economy
    - 3. A strong natural resource base
    - 4. A shift from primary to secondary and tertiary production
  - C. The growth pole concept and the Brazilian model
  - D. Internal inequities

Discussion - Snake in the Grass: A Case Study

I. Description of each character in the case

II. Identification of the central issue

III. Identification of related issues

IV. Articulating the two sides

V. Role play: Ted Koppel's Nightline

VI. Where do you stand on building the dam

Week 6

Global Heritage Film - *Aquirre: Wrath of God*

10/4 Tuesday
Reading - Text, Chapter 8, pages 175-192
Lecture - The Interdependence of Life: Biodiversity and Brazil's Rain Forest

- I. What is biodiversity?
  - A. Species diversity and intraspecific diversity (hybrid vigor)
  - B. Extent of problem

(endangered species; extinction rate)

II. Why is diversity important/necessary?
  A. Anthropocentric view - value to us as humans
    1. Goods
    2. Services
    3. Actual vs. potential
  B. Biocentric view - inherent value of species
    1. balance of nature
      a. food chains, food webs, interdependence of organisms
      b. keystone species
    2. moral/ethical reasons - equal value of all species

III. Why Brazil as focus of this problem?
  A. Biodiversity of Brazil
  B. Large number of endemics
  C. Low reversibility of damage to this ecosystem
  D. Vertical organization of population - epiphytes

IV. What are the causes of species depletion?
  A. "Development"
  B. Sustenance
  C. Products
  D. Recreation
  Underlying cause - population growth

V. Why is the issue difficult to address?
  A. No accurate measure of scope of problem
  B. Potential for good vs. certainty of economic gain
  C. Impact not immediate - current vs. future generations
  D. Impact cumulative
  E. "Individuals" not necessarily humans
  F. No agreement on level on which to focus

VI. What can be done?
  A. Preservation vs. conservation
  B. Species focussed strategies
    1. Laws/Regulations - Endangered Species Act
    2. Captive breeding programs
    3. Germ plasm repositories
  C. Ecosystem focussed strategies
    1. Extractive reserves
    2. Buffer zones
    3. Wildlife corridors
    4. Ecological islands
  D. Addressing underlying causes

1. Sustainable life styles
2. Population growth

Primary reference: E. O. Wilson, The Diversity of Life (Cambridge: Harvard University, 1992)

Laboratory - **Habitat and Niche - Lab Manual, Chapter 3**
Students will visit the three communities selected earlier in the semester to determine niche relationships of tree species.
Stratagem Game

10/6- Thursday
Reading - *The Storyteller*, Mario Vargas Llosa.
Quiz 4

Lecture - Conquistadors, Catholicism, and Capitalism: Converting People and Land in South America

I. Introduction
   A. "Explore and conquer"
   B. The economic bottom line in life
   C. Power according to Foucault
   D. Global vs. local
   E. Link between modernity and mobility

II. History of Colonization
   A. Taking over
      1. Discoveries by the Portuguese
      2. The Jesuits
      3. Early settlements
      4. Timber
      5. Salvador the capital
   B. Colonial Brazil
      1. Sugarcane
      2. The Union
      3. Expansion
      4. Gold

III. The March Toward Modernity: The Decolonizing of Brazil
   A. Independent Brazil
      1. Portuguese court transferred to Brazil (1808-1821)
      2. Rio de Janeiro the capital
      3. Independence proclaimed (1822)
      4. Coffee
   B. The Brazilian Empire (1822-1889)

    1. Pedro I (1822-1831)
    2. Pedro II (1831-1889)
    3. Rubber
- C. The Brazilian Republic (1889-1930)
    1. Slavery abolished (1888)
    2. Federation with a President
    3. Exile of Emperor
    4. Collapse of rubber industry
    5. Immigration
- D. The "New Republic" (1930-1937)
    1. Getulio Vargas (1930-1945)
    2. Fighting for the Allies (1942-   )
    3. Volta Redonda steel mill
    4. 1954 suicide of Vargas
- E. Modern Brazil
    1. Dom Bosco inspires Juscelino Kubitschek (1956-1961)
    2. Brasilia the capital (April 21, 1960)
    3. Petroleum
    4. The military regime (1964-1985)
    5. National indebtedness
    6. Iron ore - Carajas
    7. Ethanol
    8. Ethanol
    9. Regaining democracy (1985-1989)
    10. Resignation of elected president (1989-1992)
    11. Formal and informal economy
    12. Environmental problems
        - a. Pollution > unhealthy air
        - b. Unemployment > palm poachers
        - c. Mud slides > erosion
        - d. Contaminated water > cholera and hepatitis
        - e. Poverty > favelas and squatters
        - f. Garbage > smell
        - g. Resentment > hatred

IV. Gender, Class, and Race Issues: Colonization Continues

Terms

El Dorado
Michel Foucault
Indigenous Indians
Tupi
Gyarani
Treaty of Tordesilla (1494)
Pedro Alvares Cabral

pau-brazil
Yoruba nation
Bandeirantes
right of uti possidetis
Golden Law (1888)
Itaipu Treaty (1966)

Discussion - Prophets from Brazil: A Case Study.

I. Description of each character in the case

II. Identification of the central issue

III. Identification of related issues

IV. Articulating the two sides

V. Role play: Ted Koppel's Nightline

VI. Where do you stand on building the dam

10/8-11 - MID-TERM BREAK

Week 7

10/13- Thursday
Reading - Text, Chapter 3, pages 55-79
Lecture - "Religion in Brazil: From Civil Religion to Liberation Theology"

I. Established Religion in Brazil
  A. Roman Catholicism
    1. Corcovado and Pao de Acucar [Sugar Loaf Mountain]
    2. Churches
  B. Protestant Evangelicals
  C. The Charismatic Movement: The Assembly of God Church
  D. Spiritism or Kardecists
    1. History
    2. Spiritualistic book stores
    3. Temple of Good Will
  E. Civil Religion
    1. Carnival and fiestas
    2. Folk dances
    3. Nationalism via soccer

4. Soap operas
5. Rubber tappers' movement - Chico Mendes
6. *Capoeira*

F. Black Religion
   1. Candomble
      a. Iemanja
      b. Oxala
      c. Pelourinho
      d. Experiencing candomble worship
   2. Umbanda
   3. Macumba
   4. *Lembrancas do Bonfim*

G. The Need for Criticism

II. Critical Religion in Brazil: The Rise of Liberation Theology
   A. The History in Latin America
      1. Late 50s
      2. Vatican II (1962-1965)
      3. Medellin (1968)
      4. Paulo Freire's *Pedagogy of the Oppressed* (1970)
      5. Brazil's liberation theologians
         a. Hugo Assmann (1933-)
         b. Clodovis Boff (1944-)
         c. Leonardo Boff (1938-)
         d. Ruben Alves (1933-)
   B. Marxist social analysis
   C. Faith and ideology
   D. From disclosure to transformation, theory to praxis
   E. The feminist contribution
      1. Twofold hermeneutic
      2. Biblical materialism

III. A Case Study: Rio's Rocinha

IV. The Demise of Liberation Theology?
   A. The Vatican's silencing of Leonardo Boff
   B. The coalition with Lula
   C. Transformation rather than demise

Discussion - Base Communities as Model for American Religion?

1. What is a base community?

2. Simulating a base community meeting

a. In your group, discuss what would go on at a base community meeting

b. What is the primary social concern being addressed (maybe you want to identify a concern of the thiel community as the concern of the meeting)

c. What are the dynamics at work in the meeting?

d. What is the result of the meeting? Does it result in change?

3. How does the religious situation in America compare with the situation in Brazil? What might Americans learn from Brazilian religion?

4. What would Liberation Theology say about American religion?

5. How might the base community model enrich American religion?

6. What is troublesome or worrisome about changing religion?

Week 8

Global Heritage Film - *Green Wall*

10/18- Tuesday

- Reading - Text, Chapter 9, pages 194-214

Laboratory - **A Tropical Rain Forest**

Field trip to the Cleveland Zoo's Tropical Rain Forest Exhibit. Natural systems will be observed and principles studied in previous lab sessions will be applied.

10/20- Thursday

Lecture - The Dislocation of Ethnic Identity and The Eclipse of the Rain Forest: The Politics of Nationalism

I. The Politics of Nationalism
    A. Nationalism defined
    B. On the acquisition of a national identity
    C. Civil religion
    D. Music as national identity-builder: Heitor Villa-Lobos as nationalist composer
    E. Ethnicity in Brazil
    F. Ethnic integration through inter-marriage
    G. Systematic exclusion from the social class system: the indigenous peoples

II. The Eclipse of the Rain Forest
    A. Take the quiz on "Amazon Ecology" and "Deforestation and Development"

B. The Basics of the Brazilian Rain Forest of the Amazon

C. Deforestation

  1. See Briefing Paper - Paragominas (as a representative example of the effects of development on the rain forest)
  2. Statistics
  3. Causes

D. Agroforestry systems for restoring productivity to degraded lands

III. The Dislocation of Ethnic Identity: The Indigenous Indians of Brazil

A. Map of Indian Lands in Brazil

B. Basic stats on "Specials Areas" or Indigenous Lands in Brazil

C. Constitutional rights

  1. Right to lands traditionally occupied
  2. The right to cultural diversity
  3. Demands for completing the demarcation
  4. Revising the '88 Constitution

D. An "Indian" experience

  1. Otto Austel, M.D.
  2. Confusion from loss of identity
  3. Clovis Miranda's presentation
  4. Indians at the Sape Lodge
  5. Visit to FUNAI
  6. Carajas confrontation
  7. Handicrafts

Quiz 5

Discussion - Who Needs Trees Anyway? Walking the Tightrope Between Immediate Needs and Long-Term Goals.

1. Do you think the United States citizens have a very strong sense of nationalism? What has contributed to our nationalistic spirit? What differences do we have from Brazil in this regard?

2. Think of some ways in which you make tough decisions between "immediate needs and long-term goal"? Think of some ways in which America has made tough decisions between "immediate needs and long-term goals"? Think of some ways in which Brazil has made tough decisions between "immediate needs and long-term goals"?

3. Sam Poole, Thiel '69, spoke to us last week on strategic alliances in the corporate world. He pointed out how small businesses like the MAXIS company that he is President of is able to maintain its identity and its "local" character by entering into alliances with segments of the "global" system. In The Storyteller, Mascarita or Mask Face drinks deeply of the global system in studying anthropology and then puts his knowledge into action on behalf of the indigenous people of Peru. This functions, in effect, as an alliance with the global system which turns out

being beneficial for maintaining the identity of the local peoples. In fact, he served to keep their traditions alive. Dr. Otto Auxtel seems to be functioning in a similar way in Brazil. This raises the question: While the global system at one level is destroying the local, is an alliance with it maybe necessary for the local to survive?

4. You are a Brazilian government planner for the Ministry of the Interior. The problems raised by the incredible density of people in the coastal cities impact on the work you do. Brainstorm about what government policies might be developed to help alleviate the problems caused by urbanization.

5. What can you do to help save the world's rain forests? Which of the following (or others you might think of) do you think are the most helpful?

- encourage local merchants to find out where their products come from
- avoid buying tropical lumber products unless you can be sure they are not endangered species and have been logged using sustainable methods
- avoid purchasing beef produced in countries where you know that tropical forests are being systematically cleared for pasture
- support products that sustain the rain forest, e.g., Ben & Jerry's Homemade Ice Cream
- visit the rain forest, for ecotourism can help
- visit U.S. rain forests
- increase paper recycling
- be more energy efficient
- share your knowledge of the importance of tropical forests with others
- join a rain forest protection group
- adopt an acre of rain forest for $35.00 or become a Guardian of the Amazon through the World Wildlife Fund for $25.00
- teach your children about these issues
- organize a "Rain Forest Awareness Week" at a local school
- write your elected officials
- participate in World Bank decisions
- support development of international laws
- write to corporations

Video - *Our Disappearing Forests* (19 minutes).

Week 9

Global Heritage Film - *Black Orpheus*

10/25 Tuesday

Reading - "The Miracle of the Birds" by Jorge Amado
"The Ex-Magician from the Minhota Tavern" by Murilo Rubiao

Lecture - Magical Mystery Tour: Literature in Brazil.

I. A Brief History of Latin American Literature: 1500s to 1950s

II. The Boom: Latin American Literature, 1960 to the present

III. Magical Realism
    A. Definition
    B. Characteristics
    C. Magical Realism and our readings
        1. Mario Vargas Llosa's The Storyteller
        2. Jorge Amado's "The Miracle of the Birds"
        3. Murilo Rubial's "The Ex-Magician from the Minhota Tavern"

Laboratory - **Finish Stratagem game**
Stratagem is a sophisticated simulation game in which players take roles as government ministers and run the affairs of their own developing country over a fifty-year period. When the game begins, their country is at a stage of economic and social development similar to that found widely in Latin America and Asia today. The goal is to reach a high standard of living and a sustainable level of development by the end of the game. The challenge of the game is finding a path to sustainable development. Players are given the freedom to implement a wide range of social and economic decisions, but they soon discover that if they are to be successful, their actions must reflect an awareness of the many cause-effect relationships at work in the economy.

10/27- Thursday
Lecture - The Symbolism of Samba: Music in Brazil

I. Samba Defined
    A. A musical composition
    B. A dance
    C. A gathering

II. Related Notions
    A. Bamba
    B. Escola de samba
    C. Palacio do Samba
    D. Sambas de enredo
    E. Ensaios
    F. Quadras

III. The Social Implications of Samba

IV. The Political Implications of Samba

V. Listening to Samba

VI. Dancing the Samba

Quiz 6

Discussion - Art for Art's Sake? The Utility or Non-Utility of Art.

1. How is samba similar to American popular music? Do we in our society have anything approaching the breadth of samba?

2. What would you include in the arts?

3. How are the arts broadly defined valuable to you? What value do they have beyond entertainment?

4. How much would you suffer if all forms of artistic experiences were closed to you? To what degree would your life be diminished?

5. Do you practice any form of artistic expression/ If so, what does it add to your life?

6. If you were on a panel for the National Endowment for the Arts, would you approve a grant of $85,000 to an artist whose works to be shown in the Endowment-sponsored Art Festival included a painting of a man urinating on the cross?

Week 10

Global Heritage Film - *Bye Bye Brazil*

11/1- Tuesday
Lecture - Conclusions and Review

I. Notes on Brazilian Economics: The Word from A. S. Cunha
    A. The Optimistic View
        1. A new stabilization plan
        2. Foreign investment
        3. Some stats
            a. GDP
            b. Agriculture production
            c. Auto production
            d. Exports
            e. Need for privatization?

- f. End indexation
- g. Financial relations sound

- C. The Nature of the Crisis
  - 1. Political development lags behind economic development
  - 2. Waste of resources
  - 3. Life without government

II. Notes on Brazilian Politics: The Word from David Fleischer

- A. This year's election
- B. Voting
- C. The ballots
- D. No automation
- E. Three voting styles
- F. Buying of votes
- G. Counting ballots
- H. Economics and politics
- I. Television and politics
- J. Lula and the Workers' Party
- K. Caradosa and the Brazilian Social Democratic Party
- L. Patronage
- M. Facts

III. Environmental Initiatives in Brazil

- A. Carajas - environmental efforts by CVRD
- B. Goeldi Museum in Belem
- C. Manaus museums and folk dances
- D. Salvador: Cepal, Masterplan, Environmental Protection Agency
- E. Curitiba: ecological capitol
- F. Iguacu: educational-ecotourism efforts
- G. Itaipu: botanical reserves and museum
- H. Sao Paulo: State agency, CETESBE, Parks, Cubatao
- I. Rio de Janeiro: Parks
- J. IBAMA (the National Environmental Institute)
  - 1. Forest Products Laboratory
  - 2. National Center for Sustainable Development of Traditional Communities
  - 3. Brazilian National Marine Park of Abrolhos
  - 4. The Fishery Research and Extension Center of the Northeast Region
  - 5. Remote Sensing Center
  - 6. Aquaculture Stations
  - 7. Botanical Garden of Rio de Janeiro
  - 8. Conservation units
  - 9. TAMAR
  - 10. CEMAVE (Center for the Study of Migratory Birds
  - 11. Quality Control of the Environment
- K. IMAZON (Institute of Man [sic] and the Amazonian Environment
- L. Woods Hole Research Center

M. Extractive Reserves

N. CEDI (Ecumenical Center for Documentation and Information

O. Earth Summit (the United Nations Conference on Environment and Development - June 3 to June 14, 1992)

Laboratory - **Medicine Man** (video)

Students will view the film, Medicine Man, as a stimulus for discussion of the ramifications of development of the rain forest including the impact of these activities on indigenous peoples.

Discussion questions

1. What are some actual social, political, and economic issues brought up in this film?

2. In what ways was the scientific method demonstrated in the activities of the scientists in this film? Cite examples from the film that demonstrate the following aspects of the scientific method:
   a. Identification of the problem
   b. Hypothesis generation
   c. Experimentation
   d. Conclusions

3. Each party involved in the activities occurring in the rain forest had a particular interest in the rain forest. Each party's interest, however, was compromised or challenged by the interest of at least one other party.
   a. State the interest of each party. The parties include:
      (1) the indigenous Indians
      (2) the developers
      (3) the research scientists
      (4) the cancer victims
      (5) the environmentalists (imagine there were some present)
   b. Generate a cogent argument in defense of each party's interest, that is, why that party's interest should take precedence over the other interests represented.
   c. Weigh the arguments to determine what your group feels is the resolution to the overriding issue, i.e., concerning what, if anything, should be done about the rain forests.
   d. Discuss how it is that various groups with competing ideologies can move beyond deadlock. Is it possible to arrive at truth if everyone operates out of an ideology?

4. What are some questions that are sure to be on the upcoming exam?

11/3 Thursday Examination 2

Epilogue: Bahian Babbling

Having briskly babbled on about Brazil by way of bits or bytes of the basics of our curriculum unit on "Brazil and Biodiversity," I want to close by mentioning my second text for this project report. The passage of the Newer Testament that parallels the Tower of Babel passage is the Pentecost text in Acts 2. It tells how people from all over the world have come to Jerusalem to celebrate Pentecost. These people from all over speak all kinds of different languages. The task of the Christian apostles is to communicate with all those different people. And something amazing happens: the Holy Spirit comes and is present among them so that the babbling of these early Christians becomes more than babbling; the Spirit's presence makes possible a spiritual communication, so that barriers of language are transcended and those gathered are able to relate meaningfully with one another.

We went on our little trip to Brazil and we had our little task of trying to get into the culture and life of the people. And I have to report that something amazing happened. Brazil is filled with people who are filled with the Spirit. The spiritual center of Brazil is the state of Bahia, and especially the capital city of Salvador. That city and state were my favorite, because the spiritual dimension of life could not be missed there. But that spirit of the people was felt wherever we went. Therefore, I have a need to qualify my statement that I have merely been "babbling" about Brazil in our course and in this report. For during those thirty-six days I can say that the Bahian spirit of the Brazilian people was communicated to me. So, while I did not learn the language, and did not visit every corner of that huge country, and did not stay for years--I did experience the openness and the joy and the hospitality and the givingness and the love of the Brazilians. They were able, miraculously, to communicate with me. Therefore, I can rather proudly say that my babbling here and in my teaching about Brazil is not mere babbling; it is a Bahian or spiritual babbling, which comes out of a genuine experience with the wonderful people of Brazil. For that experience I am full of gratitude. I hope that through this project report a little of the spirit of the Brazilian people has been communicated to the reader as well.

THINK GLOBALLY - ACT LOCALLY
ENVIRONMENTAL ISSUES IN BRAZILIAN SOCIETY

- A TEACHING UNIT FOR WORLD HISTORY-

Ruth E. Tootle
1994 Brazil Fulbright Summer Seminar Participant
Pickaway-Ross Joint Vocational Center
Chillicothe, Ohio 45601

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INTRODUCTION

As a participant in the summer seminar in Brazil, I was inundated with information about Brazil and the environmental concerns she faces. While planning this project, I sifted through the materials, read books recommended during the month in Brazil and wondered how I could condense all of this newfound knowledge into a unit for my students, most of whom are repeating World History and are at-risk students at a vocational high school. I have decided to follow the proven teaching principle of KISS - keep it simple stupid! I returned to my original idea of linking the study of Brazil's environmental concerns to two major concerns of the youth I teach: jobs and preservation of the environment.

Many of the problems which Brazil must confront are global not national. Both the U.S. and Brazil must face the issues of land use, population distribution, resource utilization and conservation, industrial pollution and destruction of forested areas. Both countries face the challenge of creating enough jobs for their citizens. Finally, people of both countries need to evaluate what they can do to consume less and conserve more. In this unit, I have attempted to introduce the students to the environmental issues in Brazilian society by linking them to the same issues in American society. By doing so, I hope the students will begin to think globally while acting locally.

I have included an annotated bibliography to accompany the unit, but I did not copy many of the materials, due in part to copyright laws. I relied heavily on materials obtained from the seminar, teaching materials available from the National Wildlife Federation and the Rainforest Action Network for very reasonable prices, and the Scholastic Update magazine which is available in most libraries and is cross referenced in Readers' Guide. For additional information on the project, call 614-642-2550, Fax 614-642-2761, or send Email message to rtootle@scoca.oecn.ohio.gov

DAY 1: INTRODUCTION TO BRAZIL

OBJECTIVES:

1. Students will be able to locate Brazil and her neighbors on a map of South America.
2. Students will identify the regions and cities of Brazil shown in the slide presentation on their map.
3. Students will compare Brazilian currency with U.S. currency as to value and characteristics.
4. Students will compare Brazilian and U.S. stamps and will identify the images on the stamps.
5. Students will make a Brazilian flower arrangement.

STEP 1: Use map of South America and geography lesson provided by World Bank with the film, THE NEIGHBORHOOD OF COEHLOS. In this exercise, the students are instructed to shade and label Brazil. They are to label the other South American countries, the Atlantic and Pacific Oceans, the Caribbean Sea, and major cities of Brazil. Using a transparency of the American Airlines flight map documenting our flights to Rio and around the country, students will trace our travels around Brazil. They will also label the five geographic regions of the country.

STEP 2: Transparencies of stamps will be shown to the students accompanied by a list of possible descriptions of the stamps. They should try to correctly match stamps and descriptions. After a few minutes, students will be told that they will get a chance for a rematch after the slide presentation.

STEP 3: Slide presentation of Brazil. Using slides of my trip, students will learn about Brazil (racial makeup of the people, language, currency, soccer, geographic regions and environmental issues) and will redo the matching exercise in Step 2 for a quiz grade to test their listening skills.

STEP 4: Students will compare the currency of Brazil with U.S. currency as to value and characterics of coins and bills. I saved some of the old currency so that students could compare the old with the new.

STEP 5: Students will each be allowed to construct a dried flower from the seed pods and dried flowers that I bought in Brazil. Our arrangement will be awarded at the end of the unit to one of the students who completes all of the assignments and has perfect attendance for the ten days. A drawing will determine the winner.

In addition to the above steps, I will display other artifacts - jewelry, face masks, gourd dishes, soccer souvenirs, postcards, dried piranha, etc. - from Brazil and will play the tape of Olodum as background music. I have enough stamps, coins and a fish scale nail file so that each of the students will have a small gift from Brazil.

DAY 2: POPULATION DISTRIBUTION AND URBAN GROWTH

OBJECTIVES:

1. Students will use population charts to analyze both population distribution and population growth in Brazil.
2. Students will examine the reasons why Brazilians and people of all countries move to the city.
3. Students will compare the services provided to residents of favelas in Brazil and slums in America.
4. Students will compare jobs available to the poor in the U.S. and in Brazil.
5. Students will cite three examples from the film, THE NEIGHBORHOOD OF COEHLOS, that demonstrate the creativity of the residents of Coehlos.
6. Students will explain why residents have resisted efforts to relocate them and will give two examples of how the city government and residents of the favela work together.

STEP 1: Distribute population charts and information sheets on the five regions of Brazil from BRAZIL IN BRIEF. After reading, the class will determine where the majority of Brazilians live and theorize why population is distributed this way in Brazil. Students will be asked to discuss where they would prefer to live, rural or urban area. Using UPDATE magazine, students will compare the U.S. and Brazil's urban population concentration. They will also compare the rate of population increase in the two countries and examine the problems created by a high rate of population increase.

STEP 2: After identifying Recife on the map of Brazil, distribute and review the vocabulary words that accompany the film. Show the film, THE NEIGHBORHOOD OF COEHLOS. Before viewing the film, record the students' responses to the following four questions:

a) Why would people leave the countryside and move to the city?
b) What skills would they bring with them?
c) Why is living in a slum their only choice?
d) Why do people remain slum-dwellers?

STEP 3: After the film, ask the same five questions. Have any attitudes or perceptions changed as a result of the film? Divide the class into small groups and ask each group to compile a list of jobs that people had in the film and a list of services which the city provided the residents. Using the local phone books, students will compare their list of services with those that Chillicothe provides it people. Their list of jobs will be compared with the programs offered at the Vocational Center and with the jobs their parents have.

STEP 4: Students will then answer the discussion questions accompanying the film to test their listening skills. After they have answered as many of the questions as they can on their own, they may turn to the group for help.

STEP 5: Homework assignment, read SHATTERED ON THE STREETS, article about Rio's street children.

DAY 3: CURITIBA: ECOLOGICAL CAPITAL OF BRAZIL

OBJECTIVES:

1. Students will locate Curitiba on the map of Brazil.
2. Students will identify reasons why cities in many countries can not provide services for all of their citizens.
3. Students will list problems a city might have due to rapidly increasing population.
4. Students will identify the methods used by Mayor Lerner and the city of Curitiba to cope with rapid growth.
5. Students will discuss the issue of township zoning and growth in Chillicothe, listing the problems this has caused recently.

STEP 1: Review of film on Coehlos and article on street children. Students will list on the board the problems Coehlos faced due to rapid influx of new residents. They will also list the services that the city of Recife was unable to provide these new residents.

STEP 2: Distribute World Bank vocabulary words and discussion questions for the film, CURITIBA: CITY OF THE FUTURE? Describe the nature of the film to the students. Test the students' listening skills with a vocabulary quiz after the film. Students will take notes during the film and in groups of three will write out answers to the discussion questions. They can review the film if they missed some of the answers. Answers will also be graded. View the film.

STEP 3: Students will conduct a mini-research project comparing their community to Curitiba. The project is outlined in the teaching materials accompanying the film. Basically, they compare population, amount of green space per resident, public and private transportation, garbage collection and recycling, and pollution. The research will be conducted by the small groups and a comparison chart must be completed.

DAY 4: QUALITY OF LIFE IN YOUR COMMUNITY

OBJECTIVES:

1. Students will explore problems faced by the city of Chillicothe and Ross County.

3. Students will conduct a survey of Pickaway-Ross in preparation for our Ecology Project. The survey will document the extent of waste and the possibilities for recycling and energy conservation at our school.

4. Students will make suggestions of ways they would improve the school environment.

STEP 1: Using a series of newspaper articles on air and water pollution by the Mead Corporation and water pollution by agricultural runoff, the new landfill, the new recycling project and the new city buses that do not use gasoline, students will explore their community's attempts to deal with growth and environmental concerns. I will use the strategy of jigsaw learning to cover these topics more rapidly.

STEP 2: Students will survey their labs to begin our school-wide, board approved study of recycling and conservation at Pickaway-Ross. This is a joint project with our FFA and DECA clubs. After conducting the survey, we will be making recommendations to the school board to begin recycling products, conserving energy, buying recycled products, and improving the school environment. Savings from the project will be split by the Student Scholarship Fund and our Earth Day project which this year will be the Rainforest Action Network's Protect-an-Acre program in Brazil. If anyone wants more details on this project, contact me.

STEP 3: Homework assignment. Read PARADISE LOST? and WHAT IS A TROPICAL RAINFOREST? in preparation for our study of the Amazon rainforest.

DAY 5: THE AMAZON RAINFOREST

OBJECTIVES:

1. Students will identify the locations of the world's remaining tropical rainforests.
2. Students will define the term rainforest and will outline the four layers of the tropical rainforest.
3. Students will give four examples of interdependence in the rainforest.
4. Students will cite 10 reasons for saving the tropical rainforests and will compare maps that demonstrate the rapidly shrinking areas still covered by the rainforests.

STEP 1: Using a transparency of RAN's RAINFORESTS OF THE WORLD, students will identify the continents and countries of the world with remaining rainforest. Comparisons of the current map with maps of 1960, 1970, 1980 and 1990 will demonstrate the loss of rainforest in the last 34 years.

STEP 2: Distribute RAN's fact sheet, WHAT IS A TROPICAL RAINFOREST?, to the students. Using this fact sheet, students will define the term "tropical rainforest". On their maps students will locate the Tropic of Cancer to the north of the equator and the Tropic of Capricorn to the south to indicate the areas where temperature and precipitation create these forests.

STEP 3: Using a poster obtained from PROJECT FOR BELIZE, students will identify the four layers of the rainforest and identify some of the flora and fauna in each layer. Using information from the poster and their reading assignment, PARADISE LOST?, students will give four examples of interdependence in the rainforest.

STEP 4: As a wrapup, have students list on the board the reasons for saving the rainforest. After they are finished, show a transparency of National Wildlife Federation's chart, WHY SAVE THE RAIN FORESTS?, which list 10 reasons for doing so. Compare the two lists.

STEP 5: Use computer program to generate a crossword puzzle using the vocabulary words in the glossary contained in the fact sheet. This can serve as a take-home quiz.

DAY 6: SLASH AND BURN VS. SUSTAINABLE HARVESTING

OBJECTIVES:

1. Students will identify the main reasons for the destruction of the rain forest in Brazil.

2. Students will explain why profits from "slash and burn" agriculture are short lived.

3. Students will construct a cycle graph to demonstrate the effects of "slash and burn" farming.

4. Students will compare the economic value of land that is sustainably harvested for fruits, latex and timber with land that is clear-cut and land that is used as cattle pasture.

STEP 1: Using the article, PARADISE LOST?, students will identify the main reasons the Amazon rain forest is being systematically destroyed. From the same issue of UPDATE magazine, students will analyze a map that projects the amount of rain forest that will remain in the year 2010 if the rate of destruction continues at the current pace.

STEP 2: Students will view the video, RAINFORESTS: PROVING THEIR WORTH, and will complete a cycle graph demonstrating the cycle of destruction that begins with "slash and burn" farming.

STEP 3: Using the fact sheet, RATES OF RAINFOREST LOSS, students will compare the economic value of land that is sustainably harvested with the value of land that is clear cut and land that is used for cattle pasture.

STEP 4: While students are taking inventory of forest products they use (Rain Forest Pantry), treat them to Ben and Jerry's Rainforest Crunch ice cream and Rainforest Crunch, manufactured by Community Products. After their personal inventory is completed, distribute the RAN Factsheet 50, SUSTAINABLE RAINFOREST PRODUCTS. Ask students to look over the list of products carefully since they will be choosing two to three products to sell in our fund raising project for RAN's PROTECT-AN-ACRE Program or the Nature Conservancy's ADOPT-AN-ACRE Program.

DAY 7: INDIGENOUS PEOPLE OF THE RAINFOREST

OBJECTIVES:

1. Students will define the terms "indigenous people" and sustainable (extractive) harvesting.
2. Students will identify the areas of Brazil inhabited by indigenous people.
3. Students will identify the threats to these people and complete a bar graph demonstrating the decline in their numbers during this century.
4. Students will compare the agricultural practices of indigenous people of the Amazon to the newer practices of "slash and burn" and grazing.
5. Students will write a brief essay comparing the Indian philosophy of land stewardship and conservation with that of the European settlers in Brazil.
6. Students will compare Chief Logan's speech about Shawnee coexistence with the white man in Ohio during the 18th century with a Penan chief remarks of coexistence with the "Outsiders" in Brazil.
7. Students will give two examples of indigenous peoples' fight for their land in Brazil.

8. Working in small groups, students will correspond with various NGO's in Brazil regarding their efforts to organize the indigenous people of the Amazon and fight for their tribal rights. One group helps works with Indian students who are studying in technical schools.

STEP 1: Students will use RAN's Factsheet 54, NATIVE PEOPLES OF TROPICAL RAINFORESTS, to find the definitions of indigenous people and sustainable (extractive) harvesting.

STEP 2: Using a transparency of a map from BRAZIL IN FIGURES, students will identify the lands set aside for the indigenous people of Brazil. They will also identify the extractive reserves set aside for the rubber tappers in Acre.

STEP 3: Using information from Factsheet 54 and an article from the Feb. 12, 1993, issue of UPDATE, A JOURNEY BACK IN TIME, students will identify the threats to these Brazilian native tribes. They will complete a bar graph demonstrating the extent of population decline since Portuguese discovery of the country.

STEP 4: Students will describe the traditional agricultural practices of the indigenous people, comparing them to "slash and burn" farming.

STEP 5: Display the Indian saying, "The earth is our historian, our educator, the provider of food, medicine, clothing and protection. She is the mother of our races" on the overhead projector and have the students discuss its meaning. Using the article, A JOURNEY BACK IN TIME, students will compare the Indian philosophy of land stewardship and conservation with the philosophy of the "outsiders". This essay will reflect the Indian point of view not the students.

STEP 6: Students will be given a copy of the Shawnee chief, Logan's, speech to the white settlers in the Scioto River valley in Ohio with a Penan chief's remarks of coexistence with the "outsiders" in Brazil. Students will look for similarities in the two speeches.

STEP 7: Students will use their materials to give examples of methods Brazil's indigenous people are fighting for their land.

STEP 8: Working in small groups, students will write letters to NGO's (non-governmental organizations) in Brazil to research their efforts to help the indigenous people of Brazil. These groups are listed in AMAZONIA: VOICES FROM THE RAIN-FOREST. This correspondence will be conducted by Email if possible because I have attempting to familiarize my students with this new technology.

DAY 8: WHAT CAN YOU DO?

OBJECTIVES:

1. Students will explore ways that they can become more environmentally conscious.
2. Students will participate in a school project to evaluate waste at Pickaway-Ross and propose changes to the school board.
3. Students will plan and participate in a fund raising project to purchase or protect acreage in the rainforest.
4. Students will use the Internet system to contact students in Brazil and exchange information on environmental concerns in the U.S. and Brazil.

STEP 1: Using a local newspaper article, EVERYONE CAN HELP, the National Wildlife Federation's BRINGING IT HOME page, and the book, 50 SIMPLE THINGS KIDS CAN DO TO SAVE THE EARTH, students will identify 10 things they could personally do to cut consumption, conserve resources and recycle.

STEP 2: Students will survey their labs and the school to determine the amount of recyclable materials that are simply thrown away. They will work with their vocational instructors and with the FFA and DECA clubs to compile a report to the school board with recommendations for changes. This project has already been approved by the board and was developed by the Social Studies and agricultural instructors at PRJVC. The board has agreed to let us use half of the money realized by recycling for our efforts to save a portion of the rainforest. I do not want to take time to detail this project at this time but would send a copy of our proposal and project to interested teachers.

STEP 3: Students will plan and coordinate a project to raise funds for our rainforest project. We will either participate in RAN's Protect-an-Acre program or the Nature Conservancy's Adopt-an-Acre Project. I will let the students choose. Our approved project this year is to sell Rainforest Crunch and other products produced by Cultural Survival (see Factsheet 50).

STEP 4: Students will send out an Email request for key pals in Brazil or other countries that have remaining rainforest. They will exchange information about environmental issues in our countries. My students have become addicted to Email and have already completed two projects. For teachers without Email, there is a list of pen-pal organizations on the BRINGING IT HOME page.

BEST COPY AVAILABLE

As I planned this last day, I discovered an address for an information packet created by high school students entitled "How to Organize a Rainforest Awareness Week at Your School". This is in the 50 SIMPLE THINGS book, and the phone is (415) 381-6744, Creating Our Future, 398 North Ferndale, Mill Valley, CA 94941. Teachers may want to take a look at the packet.

Also, as I look back over the project it occurs to me that I could never finish some of these sections in a day, please consider that if you use the segments. They are more divisions of topics than they are daily plans.

As a wrap-up of the project, the Food Service teacher at Pickaway-Ross, who happens to be going to Brazil herself in a Rotary exchange program is planning a Brazilian meal for my students. They are scanning recipes to help her select a menu at this is being typed. As a treat to my students, I plan to show the feature film, THE EMERALD FOREST, and serve guarana and popcorn, treats from our two nations. My students enjoyed visiting Brazil through my slides and stories and artifacts. Who knows, we may even form our own RAG - that's Rainforest Action Group- for those of you who are not PC (politically correct).

Ruth E. Tootle
Social Studies Dept.
Pickaway-Ross JVC

BIBLIOGRAPHY

AMAZONIA: VOICES FROM THE RAINFOREST, Rainforest Action Network, 301 Broadway, Suite A, San Francisco, 94133, U.S.A., (415)398-4404.

A resource and action guide to NGO's around the world. Lists organizations by country and describes the areas of interest of groups.

BRAZIL IN BRIEF, Brazilian Embassy, Cultural Sector, 3006 Massachusetts Ave., NW., Wash. D.C., 20008.

Brief overview of the country, its geographic regions, cultural customs, food, fauna and flora.

BRAZIL IN FIGURES, IBGE, Avenue Franklin Roosevelt, 166-Centro-CEP 20021120 Rio de Janeiro, RJ, Brazil

Current statistical information on Brazil. Useful charts, graphs and maps.

Burton, Jonathon, "Paradise Lost?", SCHOLASTIC UPDATE, Vol. 125, No. 9, Feb. 12, 1993, pgs. 20-22.

Article explaining the effects of slash and burn techniques on the rainforest and its inhabitants. Discusses alternatives being tried in Brazil today.

CURITIBA: CITY OF THE FUTURE?, World Bank film, World Bank, Box 7247-8619, Philadelphia, PA. 19170.

Short, only 12 minutes, film on the city of Curitiba, documenting the reasons she is known as the "environmental capital of Brazil". Good teaching materials accompany the film.

EDUCATORS GUIDE FOR NATIONAL WILDLIFE WEEK, Natl. Wildlife Federation, April 18-24, 1994, 1400 16th Street, NW, Washington, D.C., 20036, Item No. 47704

Excellent teaching materials for all grade levels.

Margolis, Mac, "Shattered on the Streets", SCHOLASTIC UPDATE, Vol. 125, No. 9, Feb. 12, 1993, pgs. 11-13.

Description of the life of Rio's street children.

NATIVE PEOPLES OF TROPICAL RAINFORESTS (Fact Sheet 54); RATES OF RAINFOREST LOSS (15); SUSTAINABLE RAINFOREST PRODUCTS (50), WHAT IS A TROPICAL RAINFOREST (53), Rainforest Action Network, 450 Sansome, Suite 700, San Francisco, CA 94111, U.S.A. (415-398-4404.

Excellent reproducible handouts for students. East to read, great graphics, kid friendly.

RAINFORESTS: PROVING THEIR WORTH, 1990, Interlock Media Associates. Contact: The Video Project. 5332 College Ave., Oakland, CA. 94618, (800) 4-Planet.

Film poses the question: Is a living rainforest of greater economic value than one that has been cut down? Excellent presentation of sustainable harvesting by indigenous people of the forest.

RAINFOREST RAP, World Wildlife Fund, 1250 24th St., NW., Washington D.C., 20037. (202)293-4800.

Only 6 minutes long and set to rap music, students love this video that portrays the problems facing tropical rainforests and suggest ways that youth can participate in solutions.

THE NEIGHBORHOOD OF COEHLOS, World Bank film, The World Bank, Box 7247-8619, Phil., PA. 19170-8619, U.S.A. (202) 676-0581

Portrayal of the favelas of Recife where residents work hard to build homes and hope in the worst slums of Brazil. Teaching materials accompany the film.

FACT SHEET

RAINFOREST ACTION NETWORK

No. 53

WHAT IS A TROPICAL RAINFOREST?

A tropical rainforest is one of the earth's most spectacular natural wonders!

Q: Where can you find tropical rainforests?

A: Tropical rainforests are located around the equator, from the Tropic of Cancer in the north to the Tropic of Capricorn in the south. The largest rainforests are in Brazil (South America), Zaire (Africa) and Indonesia (islands found near the Indian Ocean). Other tropical rainforests lie in Southeast Asia, Hawaii and the Caribbean Islands. The Amazon rainforest in South America is the world's largest, covering an area about 2/3 the size of the continental United States.

Q: Why are they called tropical rainforests?

A: Because they're wet! Tropical rainforests are defined by their wet and dry seasons. Tropical rainforests receive 160 to 400 inches (400-1000) cm) of rain each year. Compare this with the city of Los Angeles, which only receives an average of 10-20 inches of rain a year! Because rainforests lie near the equator, temperatures stay near 75-80 degrees F. all year-round.

Q: What does a rainforest look like?

A: Picture yourself walking on a thin carpet of wet rotting leaves. If you looked up you would see an umbrella of dark green leaves. Only a spot or two of blue sky would peek through the thick mass of tree branches and leaves. You would see beautiful flowers growing wild upon the trees as well as on the ground. You would hear the constant sound of insects and birds, and falling twigs. In some rainforests, you might hear the sounds of large animals like the gorilla or jaguar.

There are so many species of plants and animals in the rainforest that, if you stand in one place and turn a complete circle, you may see hundreds of different species. This incredible number of species of living things is one of the major differences between tropical rainforests and the forests of North America.

A tropical rainforest consists of four layers: the emergent trees, canopy, the understory and the forest floor. The emergent and canopy layers make up the very top of the rainforest, where a few trees, called emergents, poke out above the green growth to reach the sun. Most of the plant growth is here in the sun, so most rainforest animals, including monkeys, birds and tree frogs, live in the canopy.

Below the canopy are the young trees and shrubs that make up the understory. The plants in this layer rarely grow to large sizes because the canopy blocks most of the sunlight. The forest floor is almost bare because very little light can get through the canopy and understory to the ground. This is where fallen leaves and branches rot quickly to release nutrients for other plants to grow. Large mammals such as tapirs and Asian elephants who are too heavy to climb up into the canopy layer live in the dim light in the understory and forest floor.

Q: How do rainforest plants and animals depend on each other?

A: In all of nature, and especially in rainforests, plants and animals depend on each other for survival. This is called **interdependence**. For example, some insects can only survive in one type of tree, while some birds only eat that type of insect. If this tree is destroyed the insects would have no home. If these insects die, birds who rely on them for food could starve to death. Because of this interdependence, if one type of plant or animal becomes extinct, several others could be in danger of extinction as well.

Q: What is the secret to making this system work?

A: One secret to this lush environment is that the rainforest reuses almost everything that falls to the ground and **decays**. When leaves fall from the trees, when flowers wilt and die, and when any animal dies on the forest floor - it decays and all of the **nutrients** in the decayed species are recycled back into the roots of the trees and plants.

Only the top few inches of the rainforest soil has any nutrients. Most of the nutrients are in the **biomass** - the animals and vegetation above the ground. The roots of the rainforest trees are not very deep, that way they can collect all of the nutrients in the top few inches of the soil.

Rainforests even recycle their own rain! As water **evaporates** from the forest it forms clouds above the canopy that later fall as rain.

Q: How do humans depend on rainforests?

A: Rainforests are essential, not just to those who live in or near them, but to everyone on the whole planet. They help control the world's climate. The destruction of the rainforest contributes to the **greenhouse effect**.

People also use many rainforest materials. Many of our medicines come from plants that grow in rainforests. Perhaps someday the cure for cancer or AIDS could be found in a tropical rainforest. Some of the medicines we use now which come from tropical plants are painkillers, **malaria** drugs, and heart disease treatment.

Many products, such as medicines and Brazil nuts, can be taken from rainforests without destroying them, but other products such as timber, gold and oil require a more destructive method of **extraction**. Logging for tropical timber and gold mining have contributed to much of the destruction of tropical rainforests.

Q: Do people live in rainforests?

A: Indigenous, or native peoples, have lived in tropical forests for thousands of years without destroying them. They use every part of the forest in a **sustainable** manner, or in a way which does not destroy the forest. Recently, many other people have moved to tropical rainforests, and use the forests in ways that destroy them.

Q: Can rainforests grow back once they have been destroyed?

A: A rainforest cannot be replaced Once it has been destroyed it will be gone forever. Once the web of interdependence has been broken, plants and animals have no way to rebuild their complex communities. Rainforests have been evolving for 70 to 100 million years. They contain plants and animals that live nowhere else on earth. When a rainforest is destroyed, so are the plants and animals who have lived there for millions of years. Once they are destroyed, they will only be memories of our past - *unless we help to preserve them now.*

GLOSSARY

BIOMASS - living and dead matter produced and including plants and animals.

CANOPY - the highest layer of the rainforest, made up of the tops of trees. Animals such as howler monkeys, red-eyed tree frogs, sloths and parrots live here.

EQUATOR - an imaginary circle around the earth, equally distant at all points from the North and South poles. It divides the earth into two halves - the Northern and Southern Hemispheres.

EMERGENT- The uppermost layer of a tropical rainforest, consisting of the tops of the tallest trees

EVAPORATE - when moisture changes from liquid water to gas in the air.

EXTRACTION - to remove something (for example, to take out Brazil nuts from the Amazon rainforest).

FOREST FLOOR - the ground layer, made up of tree roots, soil and decaying matter. Mushrooms, earthworms, and elephants all make their homes here.

GREENHOUSE EFFECT - the warming of the planet caused by chemicals which trap heat in the air. This process is being sped up by humans putting too many heat-trapping chemicals into the air. Some causes include car exhaust, factory smoke, and burning rainforests.

INTERDEPENDENCE - the concept that everything in nature is connected to each other, and cannot survive without the help of other plants, animals and abiotic factors (such as sun, soil, water and air) around it.

MALARIA - a common disease spread by mosquitos in the tropics; characterized by chills and a high fever.

NUTRIENTS - chemical parts needed for growth by living things.

SPECIES - a group of plants or animals that are able to produce new plants or animals that have traits of both parents

SUSTAINABLE - using products of the forest in a way that does not permanently destroy them, so that people in the future can also use them.

TROPIC OF CANCER - a circle around the earth, parallel and to the north of the equator. It is the area where the sun is the farthest north and directly overhead on the longest day of the year.

TROPIC OF CAPRICORN - similar to the Tropic of Cancer, but to the south of the equator.

UNDERSTORY - the second layer of rainforests, made up mostly of young trees and shrubs. Animals that live here include jaguars, tapirs, fer-le-lance snakes, and woodpeckers.

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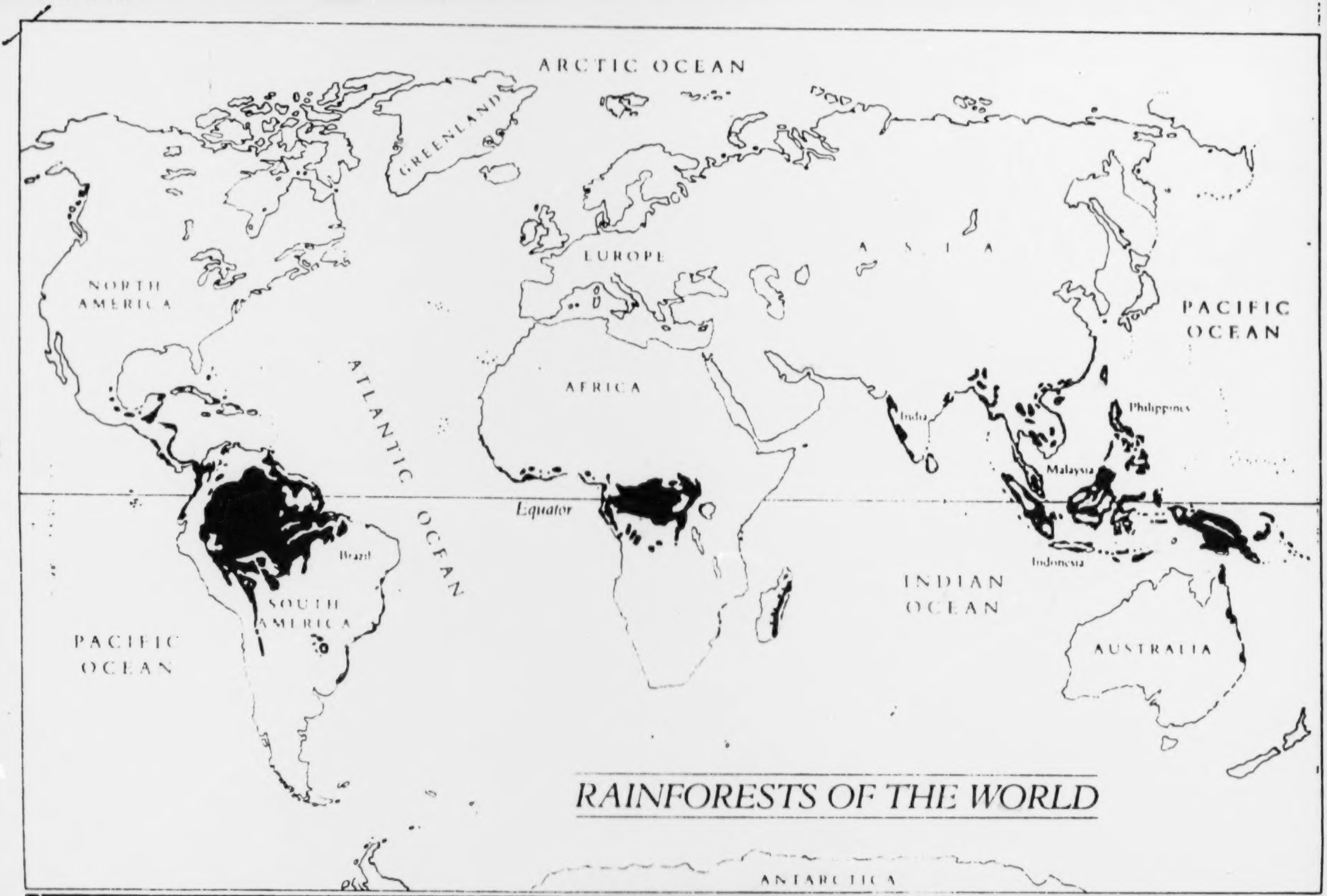
Written by Susan Silber & Illisa Kelman


ARCTIC OCEAN
GREENLAND
NORTH AMERICA
EUROPE
ASIA
PACIFIC OCEAN
ATLANTIC OCEAN
AFRICA
India
Philippines
Malaysia
Equator
Brazil
SOUTH AMERICA
Indonesia
INDIAN OCEAN
PACIFIC OCEAN
AUSTRALIA
ANTARCTICA

RAINFORESTS OF THE WORLD

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Copycat Page: Why Save Rain Forests?

TEN REASONS TO SAVE TROPICAL RAIN FORESTS

People don't have the right to destroy the world's rain forests and other habitats for their own purposes.

Many scientists think that destroying tropical rain forests could drastically change world weather patterns.

Tropical rain forests contain more than 50 percent of all plant and animal species in the world. If the rain forests are destroyed, most of these plant and animal species will be lost forever. Scientists predict this loss of species diversity would have serious consequences for the health of the planet.

Scientists have studied only a small percentage of the plants and animals that live in tropical rain forests. Every day we are losing species that could potentially provide people with new products and medicines, such as gasoline substitutes and cancer cures.

Tropical rain forests are exotic and unique wild places where amazing and strange plants and animals live. They have long inspired artists, scientists and others. Loss of these incredibly diverse forests would be a serious loss for everyone.

As rain forests disappear, so will the cultural traditions of many native peoples. These indigenous peoples have a right to live where and how they want.

As native rain forest peoples die or are forced to move, the world will lose their knowledge of rain forest plants, animals and other information that took indigenous peoples hundreds of years to gather. This information about what's in the rain forest and how it "works" could help scientists develop new crops, medicines and other products.

Many species around the world, including many North American songbirds that migrate to Latin America, depend on the tropics for survival. As more and more rain forest habitats disappear, the loss will affect many of these migrating species.

People who live outside of tropical rain forests depend on products from rain forests, including valuable hardwoods such as mahogany; and foods such as bananas, nuts and coffee. As the destruction continues, these products could become very scarce and more expensive.

The loss of thousands of acres of tropical rain forests is already causing serious local problems, including increased soil erosion and water pollution. As more deforestation occurs, the problems will increase.

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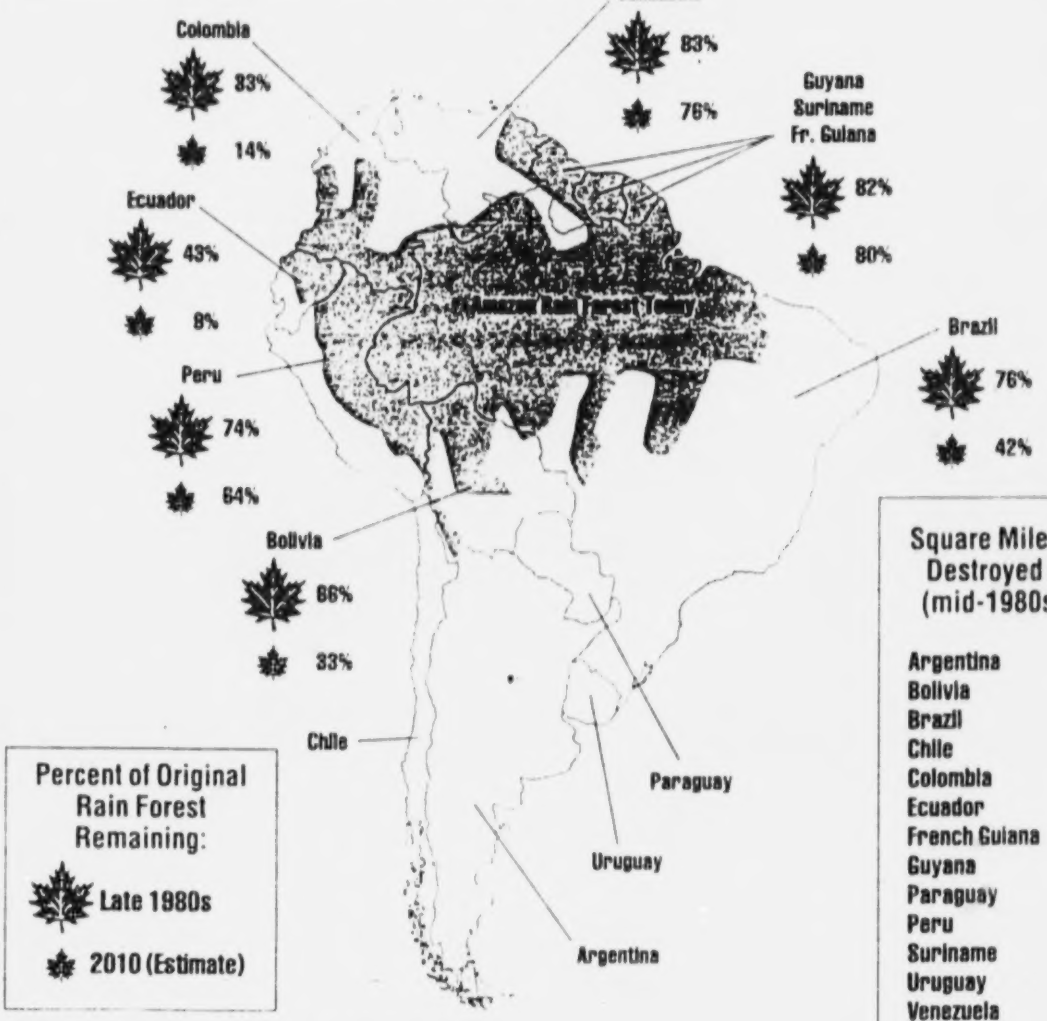
The Disappearing Rain Forest

Stretching across South America is a rain forest so vast and rich that it defies imagination. In area it equals 65 percent of the U.S. Scientists estimate that half of all the plants and animals on earth live in this immense green sea. Appropriately called the "lungs of the earth," South America's Amazon rain forest produces 10 percent of the world's oxygen. Medical experts believe that its plants, few of which have been studied, contain chemicals that could provide cures for a number of diseases.

But scientists may never get the chance to study the medical properties of these plants. Huge areas of forest are being cut and burned to clear the way for farming and mining. Alarmed by the loss of this resource, governments and conservation groups are working to slow the devastation. But unless there is a rapid reversal of the destruction, the estimates of forest loss shown on this map will come true. (Note: Map estimates are for countries with rain forests. Table shows forest destruction in all South American countries.)


Venezuela
83%
76%
Colombia
83%
14%
Guyana
Suriname
Fr. Guiana
82%
80%
Ecuador
43%
8%
Amazon Rain Forest Today
Brazil
76%
42%
Peru
74%
64%
Bolivia
86%
33%
Chile
Paraguay
Uruguay
Argentina
Percent of Original Rain Forest Remaining:
Late 1980s
2010 (Estimate)

Sources: *World Resources Institute*, *The State of the Earth Atlas*

Square Miles of Forest Destroyed Annually (mid-1980s to 1990)

Argentina	405
Bolivia	451
Brazil	5,326
Chile	182
Colombia	3,300
Ecuador	1,312
French Guiana	N.A.
Guyana	12
Paraguay	1,736
Peru	1,042
Suriname	12
Uruguay	N.A.
Venezuela	482

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RAINFOREST
ACTION NETWORK

RATES OF RAINFOREST LOSS

80 acres per minute

115,000 acres per day

42 million acres per year (estimate averaged for period 1981-90)[1]

In Brazil alone:

5.4 million acres per year
(estimate averaged for period 1979-1990)[2]

6 - 9 million indigenous people inhabited the Brazilian rainforest in 1500
In 1992, less than 200,000 remain[3]

Species extinction:

urrent estimates suggest that at least 48 species of life forms are driven into extinction every day; or 17,500 each year[4].

Economic value of one hectare in the Peruvian Amazon*:

$6,820 if intact forest is sustainably harvested for fruits, latex, and timber[5]

$1,000 if clear-cut for commercial timber (not sustainably harvested)[5]

$148 if used as cattle pasture[5]

*one hectare= 2.47 acres

urces:

1990 Forest Resources Project. Forestry Congress in Paris, September 1991; data provided by Norbert Henninger, World Resources Institute, 1709 New York Avenue NW, Washington, D.C. 20006.

National Remote Sensing Agency of Brazil (INPE); data provided by Norbert Henninger, World Resources Institute, 1709 New York Avenue NW, Washington, D.C. 20006.

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RAINFOREST ACTION NETWORK

THE VANISHING RAINFORESTS

The Americas*	Square miles	Hectares
Area of tropical rainforest in 1980:	5.83 million	923.0 million
Area of tropical rainforest in 1990:	5.25 million	839.9 million
Projected area of tropical rainforest in the year 2000**:	4.67 million	756.8 million

Leading causes of deforestation: cattle raising, subsistence farming, hydroelectric dams, mining, oil extraction, logging.

Africa		
Area of tropical rainforest in 1980:	4.06 million	650.3 million
Area of tropical rainforest in 1990:	3.75 million	600.1 million
Projected area of tropical rainforest in the year 2000**:	3.44 million	549.9 million

Leading causes of deforestation: subsistence farming, logging.

Asia		
Area of tropical rainforest in 1980:	1.94 million	310.8 million
Area of tropical rainforest in 1990:	1.72 million	274.9 million
Projected area of tropical rainforest in the year 2000**:	1.50 million	239.0 million

Leading causes of deforestation: logging, subsistence farming.

Worldwide		
Area of tropical rainforest in 1980:	11.78 million	1.88 billion
Area of tropical rainforest in 1990:	10.89 million	1.71 billion
Projected area of tropical rainforest in the year 2000**:	10.0 million	1.54 billion

Estimated number of species extinct by the year 2000: 350,000 (nearly 7 percent of Earth's plant and animal species)[1]

* **In the United States** - Puerto Rico, the Virgin Islands, Hawaii and the U.S. trust territories all have areas of tropical rainforest. Agriculture, cattle ranching, wood chip production, and a geothermal energy project (on the big island of Hawaii), are taking a large toll on these small but important tropical forests.

**Estimates based on statistics for 1980 and 1990. These statistics were obtained by phone from the World Resources nstitute.

OURCES:

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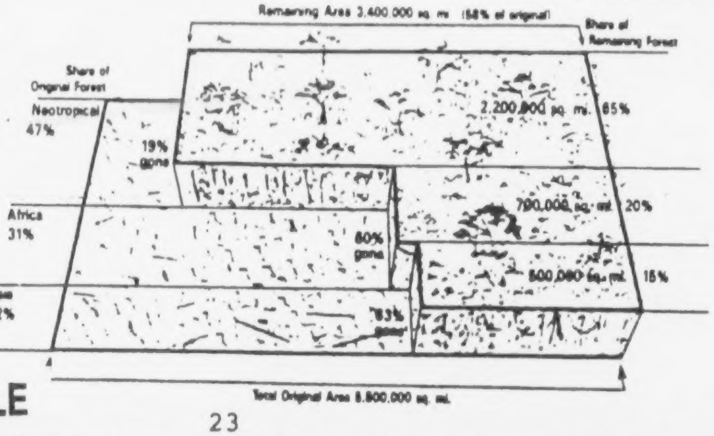
Loss of Moist Tropical Forest Original vs. Remaining Area (As of the mid-1980s)



Source: World Resources Institute, *World Resources 1990-91*, pp.123-24, from data compiled by the International Union for Conservation of Nature and Natural Resources, 1988.

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Copycat Page: Rain Forest Pantry

WOODS, CANES AND FIBERS

Woods

(furniture, floors, doors, paneling, cabinets, carvings, toys, models)

__balsa
__mahogany
__rosewood
__sandalwood
__teak*

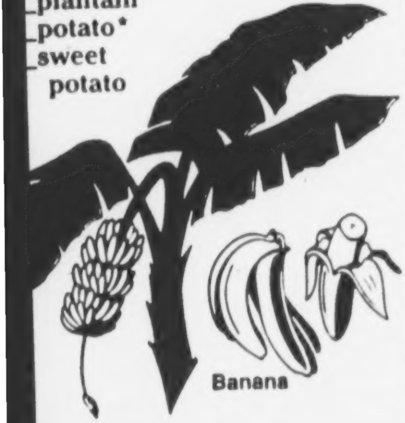
Canes and Fibers

__bamboo (cane furniture, crafts)
__jute* (rope, twine, burlap)
__kapok (insulation, stuffing)
__ramie* (knit materials)
__rattan (furniture, wicker, cane chair seats)

FOOD PRODUCTS

Fruits and Vegetables

__avocado
__banana
__grapefruit
__guava
__heart of palm
__lemon
__lime
__mango
__orange
__papaya
__passion fruit
__pepper
__pineapple
__plantain
__potato*
__sweet potato



Banana

__tangerine
__tomato*
__yam*

Spices and Flavors

__allspice
__black pepper
__cardamom
__cayenne (red pepper)
__chili pepper
__chocolate or cocoa
__cinnamon
__cloves
__ginger
__mace
__nutmeg
__paprika
__turmeric
__vanilla

Brazil Nut

OTHER FOOD PRODUCTS

__Brazil nuts
__cashew nuts
__coconut
__coffee
__corn*
__macadamia nuts
__peanuts*
__rice*
__sesame seeds*
__sugar*
__tapioca
__tea

HOUSEHOLD PRODUCTS

Houseplants

__African violet
__aluminum plant
__Anthurium Philodendrum
__*Begonia*
__bird's-nest-fern
__bromeliads
__Christmas cactus
__*Croton*
__dumb cane *(Dieffenbachia)*
__fiddle-leaf fig

Oils

__bay (bay rum lotion)
__camphor (insect repellent, medicine)
__coconut (snack food, baked goods, lotions, soap)
__lime (food flavoring, candles, soap, bath oil
__palm (snack food, baked goods)
__patchouli (perfume, soap)
__rosewood (perfume)
__sandalwood (soap, candles, perfume)

Gums and Resins

__chicle (chewing gum)
__copal (varnish, printing ink)
__dammar (varnish, laquer)
__rubber (balloons, erasers, foam rubber, balls, rubber bands, rubber cement, gloves, hoses shoes, tires)

MEDICINES

__curare
__ipecac
__quinine
__reserpine
__vincristine

**products that may have originated in other types of tropical habitats near rain forests*

Rosy Periwinkle
(*Vincristine*)

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RAINFOREST ACTION NETWORK **FACTSHEET 50**

SUSTAINABLE RAINFOREST PRODUCTS

Q: What is sustainability?

A: Sustainability is when the functions and processes of an ecosystem can be maintained (or sustained) while the needs of the present are met without compromising the needs of future generations. Here we are not referring to sustained profit or economic activity, but more importantly, we are referring to sustaining the dynamic processes at work in an ecological system. This is what supports all life, ncluding humans. The focus here is "ecological" sustainability.

Q: Why is sustainability important?

A: Economic expansion has come at the expense of ur "ecological capital", a term which some economists are now using to evaluate the level of erosion an economy inflicts upon its natural resource base. Our **present economic model ignores nvironmental degradation when assessing profits**. For an economy whose growth and health is defined by the **intensive exploitation** of natural esources, principles of sustainability must become ntegrated if we are to survive.

As we promote products like those listed below, be ware that there is a limited amount which can be onsumed. The concept of sustainability transcends he traditional rules of "supply and demand" as each cosystem determines the ceiling of its productivity. Overconsumption is a driving force behind deforestation. The primary question for us must be, ot which ice cream or candy should I buy, but, **do I need to buy this?**

Q: How can we implement sustainable practices within the rainforest?

A: There are many factors that must be taken into consideration. The first step is to **support the land and resource rights of indigenous peoples.** These knowledgeable peoples have inhabited rainforests for millenia without destroying them. We need them to teach us how to use the forests without damaging them. There are medicines, foods and other unknown treasures that can be harvested without jeopardizing the future.

Preserving indigenous cultures is key to saving the rainforest. Those from developed countries have much to learn from indigenous peoples in terms of our relationship with the Earth. By respecting and allowing them to lead the way towards a true, stable utilization of this bountiful resource, if they choose to utilize it in any commercial way at all, we have the potential of achieving true sustainability.

Q: How can I tell if a product has been sustainably harvested?

A: It is difficult. Ask questions: find out where your purchases really come from, where are your dollars really going? Who is benefitting from the profit? Is any of the profit returned to the people's supplying rainforest products or raw materials? How much? Who receives the funds there? Request financial reports, project description, accomplishments, videos & pictures and, if you can, **visit** the area to see the impact of your contribution. As a consumer, you are directly affecting theeconomy and ecology of the globe. **Please consume responsibly.**

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Rainforest Products

Product	What is it?	Availability	Retail Contact	Wholesale Contact
Rainforest Crunch	Cashew and Brazil nut brittle. All natural and preservative-free.	Case: 12 boxes per case, sixty 8 oz. boxes. Colorful 1 lbs. reusable tin by the case or cartons of eighteen. 1.5 oz bars	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Rainforest Crunch Cookies	All natural, preservative-free, chocolate Brazil nut cookies in colorful jungle scene tin.	Tins available in cases of four. Tin is 7.125" in diameter by 2.5" deep.	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Tropical Mix	All natural, preservative-free, nuts and fruit mix that includes papaya, pineapple, banana chips, cashews, Brazil nuts, and coconut.	Available in twelve or thirty ounce reusable cans. Samples are also available in fifteen ounce cellulose bags.	From the Rainforest 270 Lafayette St. New York, NY 10002 (800) EAR-TH96	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Exotic Munchies	All natural, preservative-free, dried fruit and tropical nut mix (papaya, pineapple, mango, Brazil nut, cashew nut).	8 oz. cellulose bag printed w/ vegetable inks. Available individually or in cases of 24.	From the Rainforest 270 Lafayette St. New York, NY 10002 (800) EAR-TH96	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Roasted and unsalted cashews	Cashews roasted in Canola and Safflower oils. Preservative free.	10 oz. reusable cans attractively decorated with bright illustrations using vegetable based inks.	From the Rainforest 270 Lafayette St. New York, NY 10002 (800) EAR-TH96	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Gourmet Honey Collection	Hawaiian Lehua, Hawaiian Christmas Berry, Florida Tupelo, and many other flavors.	Large and sampler jars available.	Moonshine Trading Co. P.O. Box 896 Winters, CA 95694 (916) 753-0601	Moonshine Trading Co. P.O. Box 896 Winters, CA 95694 (916) 753-0601
Gourmet Butters and Spreads	Various flavors of gourmet butters and spreads. Tropical Crunch and cashew butter- just two of several varieties available.	Large and sampler jars available.	Moonshine Trading Co. P.O. Box 896 Winters, CA 95694 (916) 753-0601	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Gift Collections of honey, butters, and spreads.	Special package includes one large jar of Hawaiian Lehua honey and jar of their newly offered Tropical Crunch. Packaged in a tropical gift box.	Available separately or in cases.	Moonshine Trading Co. P.O. Box 896 Winters, CA 95694 (916) 753-0601	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562

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Product	What is it?	Availability	Retail Contact	Wholesale Contact
Harvest from the forest cookies	Brazil and cashew nut cookie. Other ingredients include unbleached flour, eggs, non-tropical oils, and other natural ingredients.	Available in colorful 10.6 ounce bags. For West Coast consumers: Dare Foods - Kevin Rysavy 5832 Myra Ave. Cypress, CA 90630 (714) 995-1228	Harvest from the Rainforest Cookies Dare Foods P.O. Box 1058 Kitchner,Ont. N2G 4G4 Canada (800) 668-3273	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Brazil Nuts	These nuts come from a tree species which grows only in primary rainforest. Uses include nut mixes, baked goods, snacks, or candies.	Samples available in a range of grades.	Pueblo to People P.O. Box 2545 Houston, TX 77252 1-800-843-5257	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Cashew Fruit	Also from the cashew tree, cashew fruit is eaten fresh, made into fruit drinks, jams, or butters. It is also dried to a date-like consistency.	Retail and wholesale quantities available.	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Honey	Two varieties of honey mixed together. Gathered from wild beehives by rural cooperatives in Zambia and Tanzania.	Bulk wholesale quantities are available.	Walnut Acres Penns Creek, PA 17862 1-800-433-3998	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Save the Forest Nut Granola	Organic premium quality nut granola with oat flakes, wild flower honey, Brazil nuts, cashews, coconut, and cinnamon.	Only available on the East Coast to wholesale buyers.		Cornucopia Natural Foods P.O. Box 999 Dayville, CT 06241 (800) 877-8898
Ben and Jerry's Ice Cream Rainforest Crunch	Internationally famous ice cream available in 48 of our states.	For further information, contact (916) 428-1872		
Rainforest Riches Chocolates	A great variety of chocolate products with cashews and Brazil nuts.	Available in various quantities.	Blue Planet Trading Co. 717 Simundson Dr.# 111 Point Roberts, WA 98281 (604) 251-4277	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Tropical Paradise	Macadamia nut (sourced from Hawaii and Costa Rica) and coconut buttercrunch	Colorful 4 oz. tins.	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Maple Roasted Cashews and Smoked Cashews	First quality fancy Brazilian cashew pieces prepared with maple syrup and sea salt. Smoked or roasted.	A range of sizes and packaging materials.	Ward's Pond Farm RFD. 3, Box 1380 Morrisville, VT 05661 1 (802) 888-3001	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562

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Rainforest Products (continued)

Product	What is it?	Availability	Retail Contact	Wholesale Contact
Toucan Chocolates	Scrumptious boxed chocolates containing Brazil nuts and cashews. Colorful packaging is environmentally sensitive.	Range of sizes	Toucan Choclates 31 Wyman St. Waban, MA 02168 1 (617) 964-8696	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Rainforest Crisp	Natural granola cereal with cashews, Brazil nuts, and raisins.	In both 13.5 oz boxes and in bulk from your local health food store.	Can be found at your local health food store.	Rainforest Products Inc. P.O. Box 250 Mill Valley, CA. 94942 (415) 383-8111
Rainforest Essentials Soap	All natural, vegetable-based soap made with Copaiba oil harvested by rubbertappers. No animal products or testing. Massage bar has	4oz. bars, individual or 3-packs in cellulose bags w/straw tie. Also available in cases of thirty-six 3-packs or 100 individual-packs.	RainforestAction Network 301 Broadway San Francisco, CA 94133 (415) 398-4404	RainforestAction Network 301 Broadway San Francisco, CA 94133 (415) 398-4404
Rainforest Moisture Shampoo and Conditioner	Copaiba oil harvested by rubbertapper in Rondonia, Brazil. Other ingredients: honey from Zambia and wild African beeswax.	Available by August 1, 1991 in 8 oz. bottles.	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Rainforest Essentials Body Lotion	Ingredients include apricot oil, jasmine oil, honey, vitamin E, and aloe vera. For a complete list of ingredients contact the address listed.	Available by August 1, 1991. in 8 oz. bottles.	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562	Cultural Survival Inc. 53A Church St. Cambridge, MA 02138 (617) 495-2562
Clothing from Patagonia	Patagonia purchases Tagua nuts from indigenous peoples of Latin America via Conservation International	Available on men's polo shirts and other sportswear. For specifics, ask sales representative.	Patagonia P.O. Box 150 Ventura, CA 93002 (800) 523-9597	Conservation International 1015 18th St. NW, #1000 Washington DC 20036 (202)429-5660
Clothing from Espirit	Espirit also purchases via Conservation International.	Ask for the articles of clothing that have the Tauga nut buttons at any Espirit outlet.	Espirit 900 Minnesota San Francisco, CA 94107	Conservation International 1015 18th St. NW, #1000 Washington DC 20036 (202)429-5660

It would be irresponsible to characterize the above list as the sole representatives of rainforest products. The potential and capacity of sustainably harvested products from rainforests is yet to be totally understood and explored by mankind.

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FACT SHEET

RAINFOREST ACTION NETWORK

No. 54

NATIVE PEOPLES OF TROPICAL RAINFORESTS

In this fact sheet you will read about people whose lives are very different from ours. The first section gives a general description of Indigenous people living in the world's rainforests. The last section is a made-up story about a woman from the Penan tribe in the island of Borneo. She has lived in the rainforest her whole life and knows better than anyone what happens when the forest is destroyed.

Q: WHO ARE INDIGENOUS PEOPLE?

A: Tropical rainforests are bursting with life. Not only do millions of species of plants and animals live in rainforests, but many people also call the rainforest their home. In fact, **Indigenous**, or native, people have lived in rainforests for thousands of years. In North and South America they were mistakenly named Indians by Christopher Columbus, who thought that he had landed in Indonesia, then called the East Indies.

Q: IN GENERAL, HOW DO INDIGENOUS PEOPLE LIVE?

A: Although many Indigenous people live much like we do, some still live as their ancestors did many years before them. These groups organize their daily lives differently than our **culture**. Everything they need to survive, from food to medicines to clothing, comes from the forest.

FOOD

Besides hunting, gathering wild fruits and nuts and fishing, Indigenous people also plant small gardens for other sources of food, using a **sustainable** farming method called shifting cultivation. First they first clear a small area of land and burn it. Then they plant many types of plants, to be used for food and medicines. After a few years, the soil has become too poor to allow for more crops to grow and weeds start to take over. So they then move to a nearby uncleared area. This land is traditionally allowed to regrow for 10-50 years before it is farmed again.

Shifting cultivation is still practiced by those tribes who have access to a large amount of land. However, with the growing number of non-Indigenous farmers and the shrinking rainforest, other tribes, especially in Indonesia and Africa, are now forced to remain in one area. The land becomes a wasteland after a few years of overuse, and cannot be used for future agriculture.

A Penan mother with her sleeping infant who had come to join a blockade of timber trucks into the rainforest.

EDUCATION

Most tribal children don't go to schools like ours. Instead, they learn about the forest around them from their parents and other people in the tribe. They are taught how to survive in the forest. They learn how to hunt and fish, and which plants are useful as medicines or food. Some of these children know more about rainforests than scientists who have studied rainforests for many years!

Q: WHAT ARE SOME DIFFERENCES IN INDIGENOUS CULTURES?

A: The group of societies known as Europeans includes such cultures as French, Spanish and German. Similarly, the broad group, Indigenous peoples, includes many distinct culture groups, each with its own traditions. For instance, plantains (a type of banana) are a major food source for the Yanomani from the Amazon while the Penan of Borneo, Southeast Asia, depend on the sago palm (a type of palm tree) for food and other uses.

Q: WHY IS THE LAND SO IMPORTANT TO ALL INDIGENOUS PEOPLE?

A: All Indigenous people share their strong ties to the land. Because the rainforest is so important for their culture, they want to take care of it. They live what is called a sustainable existence, meaning they use the land without doing harm to the plants and animals that also call the rainforest their home. As a wise Indigenous man once said, *"The earth is our historian, our educator, the provider of food, medicine, clothing and protection. She is the mother of our races."*

Q: WHY ARE TRIBAL CULTURES IN DANGER?

A: Indigenous peoples have been losing their lives and the land they live on ever since Europeans began colonizing 500 years ago. Most of them died from common European diseases which made Indigenous people very sick because they had never had these diseases before. A disease such as the flu could possibly kill an Indigenous person because s/he has not been exposed to this disease before.

Many Indigenous groups have also been killed by settlers wanting their land, or put to work as slaves to harvest the resources of the forest. Others were **converted** to Christianity by **missionaries**, who forced them to live like Europeans and give up their cultural traditions.

A Penan dad teaching his children the secrets of the forest.

Until about forty years ago, the lack of roads prevented most outsiders from **exploiting** the rainforest. These roads, constructed for timber and oil companies, cattle ranchers and miners, have destroyed millions of acres of rainforest each year.

All of these practices force Indigenous people off their land. Because they do not officially own it, governments and other outsiders do not recognize their rights to the land. They have no other choice but to move to different areas, sometimes even to the crowded cities. They often live in poverty because they have no skills useful for a city lifestyle and little knowledge about the culture. For example, they know more about gathering food from the forest than buying food from a store. Imagine being forced to move to a different country, where you knew nothing about the culture or language!

Q: ARE INDIGENOUS GROUPS FIGHTING FOR THEIR LAND?

A: Indigenous groups are beginning to fight for their land, most often through peaceful demonstrations. Such actions may cause them to be arrested or even to lose their lives, but they know that if they take no action, their land and culture could be lost forever. Kayapo Indians, for example, recently spoke to the United States Congress to protest the building of dams in the Amazon, and were arrested when they arrived back in Brazil, accused of being **traitors** to their own country. In Malaysia, the Penan have been arrested for blocking logging roads.

Many people living outside of rainforests want to help protect the Indigenous people's culture. They understand that Indigenous people have much to teach us about rainforests. By working with these groups, we can learn important information about rainforests - its **ecology**, medicinal plants, food and other products. It is crucial to realize that they have a right to practice their own lifestyle, and live upon the land where their ancestors have lived before them.

People from all over Borneo - young and old - came to protest the destruction of their homes in the rainforest.

BEST COPY AVAILABLE

GLOSSARY

CULTURE - the total aspects of a group of people's lives, such as art, music and food, that make this group unique

CONVERT - to change from one religion or belief to another.

ECOLOGY - the study of the relationships between living things and their environments.

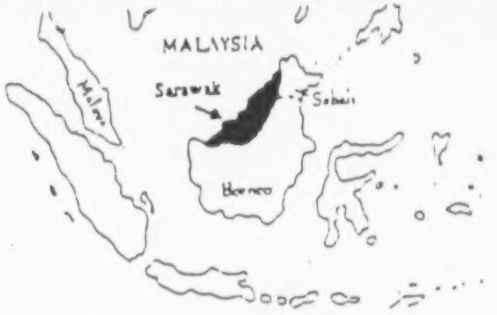
EXPLOIT - to use something, especially for profit, without considering the consequences or damaging results.

INDIGENOUS - the first, or original living things (people, animals, plants) of a certain area.

MISSIONARY - a person sent into a foreign area to carry out religious work.

SUSTAINABLE - using products of the forest in a way that does not permanently destroy them, so that people in the future can also use them.

TRAITOR - a person who gives out information to an enemy; someone who betrays hi/her country, a cause or a trust.



I love the forest. I love the smell of the flowers, the chirping of the birds, the constant hum of insects. The forest is my home.

My tribe, the Penan, has lived in the forest for hundreds and thousands of years. We know this land as well as we know ourselves. The forest gives us everything we need. We make our homes out of palm leaves and bamboo pieces, hunt wild animals with our blowpipes, and gather wild sago (from which we make starch, the main food in our our diet), fruits and honey. Our possessions are few because we move every time game or sago becomes difficult to find. We only trade salt,, tobacco, metal machetes and a few other items with the Outsiders.

The first signs of trouble were the huge noisy beasts the Outsiders called "bulldozers." With the help of these beasts a road was built leading into the middle of the forest. Why would the Outsiders want to build a road when hardly anybody ever ventured into the forest, we wondered?

We soon found out. The Outsiders brought in even more dangerous beasts they called "chain saws" to chop down the tallest trees of the forest - trees that had stood proud for many lifetimes. These trees were home to many forest animals and to the fruits we relied on for food.

I can hardly sleep many nights because of all the noise. They have scared away the animals we hunt, and poisoned and flooded the river waters. Now we must trade for food and other things once found in the forest.

Other tribes of the forest have united together with us to fight the beasts. We have often blockaded the roads, and cheer whenever the Outsiders have to stop cutting down the trees. But the forest is still being destroyed. Some of the younger tribe members have given up hope and now live in villages set up by the Outsiders. They cannot move around like they once did and most do not practice the customs they once cherished.

But we elders refuse to leave. The forest is our life. We cannot live without the forest.

We know that not all Outsiders want to destroy the forest. Some are helping us to stop the destruction. Why don't the destroyers of the forest realize that the forest belongs to everyone?

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Gazette
Lifestyles/B

Saturday, November 12, 1994
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Tyrone Johnston, Lifestyles Editor, Ext. 74

Everyone can help

t-food places recycling but use help

ews Service

er all of the fast or carry-out food our family have eaten this year gine all of the packaging piled in hen

— the pizza boxes, the burger the polystyrene foam cups and s, the clear plastic clam shells grocery's salad bar, the little sleeves for French fries

uilty do you feel? Guilty enough to fast food? No?

enough to try to send less of the to your local landfill? Here's

ut that pile of trash into e.

own next to the mound that s your family's contribution to tream of solid waste — all the uced by the companies that u with goods and services — and ain becomes a molehill

d packaging accounts for no one-third of 1 percent of the pical landfill, says University of garbologist'' William Rathje, who ted landfills in search of this kind tion.

than a third of that third of 1 polystyrene foam (known , and improperly, as)

cts notwithstanding, fast-food has become one of the ntal bugaboos of our time, along tems as disposable diapers from environmentalists to fficials consistently te fast-food packaging's ns to landfills, blaming it for 20 30 percent of the total, Rathje

the bad image stems from tonizing our harried lifestyles, nt rush against the clock, the for convenience that transforms row-away society.

fast-food packaging is without , beyond easy portability ty cuts labor costs, keeping n. And if you eat in rather than e disposable plate or cup is rbor fewer bacteria than a dish that has been through the wash.

But reality often is no match for consumer opinions and preferences. If the buying public believes polystyrene foam is bad, then polystyrene foam will be replaced. (The rap against polystyrene containers also stems from the fact that some of them used to be manufactured using chemicals that deplete the Earth's ozone layer.)

The most famous case was McDonald's abrupt abandonment of polystyrene. After initially experimenting with recycling foam cups and clamshells, McDonald's four years ago announced it was switching to paper wrappers and cardboard cups, both coated with plastic. The new containers take up less landfill space, but are much harder to recycle.

By dropping polystyrene, McDonald's gained an enormous amount of favorable publicity. But Martin Hocking, a Canadian chemist, soon pointed out that, when you consider overall environmental impacts, such as pollution during manufacture, polystyrene cups may do less damage than paper ones. And they cost less, he said.

Hocking's analysis created a brief uproar, but did nothing to check polystyrene's decline. Most fast-food purveyors have largely abandoned the stuff.

"Consumer perception about it is so strong that you see very little foam," said Bruce Ley, executive vice president for marketing for Rally's Inc., the Louisville-based hamburger chain. "You figure out how to serve products without it."

GNS

Help Earth by using less stuff

Gannett News Service

The ULS Report says you can Use Less Stuff even while you're vegging out on the couch — watching TV, listening to [illegible] reading a book.

Here's how:

■ Use rechargeable batteries in all of your remote controls and portable music players. Americans throw away 2.5 billion batteries a year.

Once in the landfill, they can corrode and leach toxic chemicals into the earth and groundwater. Rechargeable batteries significantly reduce both waste and the need for new batteries.

■ Reuse videotapes instead of buying new ones.

■ Borrow books, magazines, records and tapes. This saves money and resources.

■ Buy the biggest bags of snacks you can. Chip for chip, larger sizes use less packaging than smaller sizes. If for some strange reason you have any left, reseal the bag with a chip clip.

■ If you must leave the house, ULS suggests you travel in packs to save fuel. Carpool. Take the bus. Ride the train. You might even try walking or riding your bike.

The ULS Report also shares some ideas for environmentally friendly holidays:

■ Buy your holiday food in bulk.

■ Donate excess, leftover or unwanted candy to local food banks.

■ Take smaller portions and then go back for seconds if you're still hungry.

■ Send your guests away with extras packed in reusable deli and dairy containers.

■ Put the leftovers in the grocery bag you used to lug all the stuff home.

The ULS Report is a bimonthly newsletter published by Partners for Environmental Progress, an organization established by Dow Chemical.

For a free subscription to the report, send a self-addressed, stamped envelope to P.O. Box 130116, Ann Arbor, Mich. 48113.

For more information, call (313) [illegible] 1690.

re's some tips to help you trim from the trash

ws Service

some ways to trim back on

stop for a cup of coffee every you get — and throw away — every time? Instead, carry your

you go to a deli or store that choice of carrying out your food in a plastic or aluminum container, opt for aluminum. Both types may be equally recyclable, but it's infinitely easier to find a recycling program that takes aluminum. Most curbside and drop-off programs do, as long as you rinse out the container.

■ Get to know an art teacher. Many of them love to devise projects using polystyrene clamshells, egg cartons and those trays that go under meat and other food packages. The polystyrene is likely to wind up in the trash eventually, but at least it will live another life first.

■ Recycle pizza boxes. As long as they are reasonably clean (grease spots are OK, great gobs of sticky cheese are not), pizza boxes are accepted by many recycling programs. Your best bet is to find a pizza place that puts a liner in the bottom of the box.

■ Remember that consumer pressure is the key to changing corporate behavior. If you see wasteful packaging or needless creation of waste, let the company know.

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Copycat Page: Bringing It Home

You Can Help!

1. Learn all you can about tropical rain forests, even visit one if you can, and then share your knowledge with others. The more people know about tropical rain forests and the problems they are facing, the more likely it is that people will act to help protect them. Save the Rain forest, Inc. offers two week ecology courses in Central America and South America for high school students and teachers. Participants returning from a course are encouraged to present slide shows about their experience for community and school groups. The average cost of a two-week course is $625, which includes meals and housing. For more information, write: Save the Rain forest, 604 Jamie St., Dodgeville, Wisconsin 53533. You can also contact conservation organizations (see list on back of poster) that sponsor educational programs, fund or conduct research and help support local initiatives.

2. Write letters to your senators and representatives to let them know that you are concerned about rain forest destruction. Ask that they support programs that help protect these areas throughout the world.

3. Make personal contact with people in tropical countries to better understand what their life is like. You can contact one of the pen-pal organizations listed below. Be sure to specify the country or countries of other kids who you're interested in exchanging letters with and include a business-sized self-addressed, stamped envelope for the organization's return response. A small fee may be requested for the match-up service.

For ages 6 and up:
International Pen Friends
P.O. Box 65
Brooklyn, New York 11229

For ages 10 and up:
Student Letter Exchange
530 Third Ave.
New York, New York 10017

People to People International
501 East Armour Blvd.
Kansas City, Missouri 64109

. Raise money to support programs that are helping to protect he world's rain forests. Here are ome money-raising ideas that can also help others learn more about rain forests:

Make and sell greeting cards made of recycled paper with drawings of rain forest plants or animals. On the backs of the cards, include information about the species.

Organize a tropical party or festival featuring tropical foods and music. Sell tropical foods that contain forest ingredients.

Set up a tree-planting program to highlight the problems of tropical destruction.

Organize a "Walk for the Rain Forest." Find local sponsors and citizens to pay for each mile walked and include educational material about rain forests.

Set up a rain forest lecture program with guests that have worked or studied in tropical rain forests. Charge admission, ask for a donation, or sell refreshments.

5. Buy an acre of rain forest. The Nature Conservancy's "Adopt-an-Acre Program" enables individuals to purchase protection of an acre of rain forest in a specific nature preserve. One acre of tropical land costs $37.50. Contact The Nature Conservancy for additional information: 1815 N. Lynn Street Arlington, Virginia 22209 or call (703)841-5300, (800)628-6860.

6. Eat foods that are sustainably harvested from the rain forest. Foods such as cashew nuts and chocolate had their roots in the rain forests. Buying rain forest foods gives people living in rain forests a reason to keep forests intact.

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SELECTED SITES OF ENVIRONMENTAL CONCERN IN BRAZIL: An Overview

A Curriculum Unit for Community College, High School and General Interest Courses

Shirley M. Valencia

Participant, Fulbright-Hays Seminars Abroad Program
Summer 1994:
"Environmental Concerns in Brazilian Society"
and
Instructor, Natural and Environmental Sciences
Butte College
Oroville, California 95965 USA
August 21, 1994

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Introduction

The purpose of this independent curriculum project, in part, is to fulfill the requirements set forth by the U.S. Department of Education for participants in the Fulbright-Hays Seminars Abroad Program, and, further, to provide teaching units that may be incorporated into the existing natural and environmental science curriculum.

The "Environmental Issues in Brazilian Society - 1994" Summer Seminar lasted over five weeks, June 26 to August 1, and included touring and studying selected areas of environmental concern throughout Brazil.

This paper contains an explanatory narrative and captions to slide sets for each section providing a framework for material to be presented to college- or high school-level science and general interest classes, adult education classes, and the college educational-television audience. Each unit contains information on the specific geographic area in Brazil, the general ecology and major environmental concerns. The sections may be used individually in half-hour segments with a laboratory, hands-on portion, and/or class discussion supplementing the illustrated lecture to roundout the 50-minute class. Also, the sections may be used to supplement existing units on geography, geology, environmental science and ecology, and oceanography. Pollution control and conservation are stressed.

It is the objective of this collection of teaching units to provide students with information on a continent and country far from North America that has similar environmental problems and human concerns. It is important to recognize that there is an environmental problem and that at least one other nation is formulating policy and acting to preserve its natural heritage.

General

Brazil is a land that brings forth mega-statistics when description is attempted: the fifth largest country in the world; the sixth most populous country in the world. It is larger in area than the continental United States and makes up one-half of the continent of South America, occupying 3.2 million square miles.

Sixty per cent of Brazil is covered by forests, and 3/5ths of the total area is occupied by the Amazon River basin, with 25,000 miles of navigable water, and the La Plata river basin. The country, itself, is fairly flat with 40 per cent around 650 feet in elevation.

The main physical features are a central plateau that varies between one and three thousand feet in elevation between São Paulo and Rio Grande do Sul. The plateau is crossed by two mountain ranges, one reaching over 9,000 feet in places; the other, averaging 4,000 feet.

The Amazon basin has the largest rainforest (Selva) in the world and supplies most of Brazil's timber, mainly tropical hardwoods. Eastern Brazil is covered with tropical and semi-deciduous forests, and soil of limited agricultural value due to leaching of nutrients. The southern highlands are extensive. Vast softwood forests are now in danger of extinction because of logging for construction timber. The northeastern interior is arid and sparsely vegetated due to low rainfall, over-grazing and excessive cultivation. Central Brazil comprises the States of Mato Grosso, Mato Grosso do Sul, and São Paulo. This area contains relatively infertile grasslands and scattered shrub, best suited for pasturelands.

Areas that are becoming destinations for ecotourism include the larger gateway cities and ecologically-important regions such as the Pantanal, known for exotic birds; the Great Escarpment, with huge plateaus and waterfalls; spectacular Iguaçu Falls; the rainforests of the Amazon, with outstanding birding and fishing; and the pine-clad summits of the southern mountains.

This varied country extends southward from the Amazonian equatorial plains at 4°N latitude to the cold uplands at 30°S latitude. All of Brazil is east of New York City's longitude: thus, western Brazil observes Eastern Standard Time; whereas, eastern Brazil is on Atlantic Standard Time.

Geology

Brazil, as a part of the ancient continental landmass that formed Gondwanaland, came into being at least two billion years ago. Two stable shields predominate in Brazil, the Guianan and the Brazilian, and represent the three rock groups (igneous, sedimentary, and metamorphic). These basement rocks have been covered by younger sediments and sedimentary rocks but continue to influence Brazil's topography having produced the Guiana Highlands of far northern Brazil, the Amazonian basin immediately south, and still farther to the south, the Brazilian Highlands (Planalto).

In Paleozoic times shallow seas invaded western South America and platform deposits formed in today's Amazon Basin. This activity was followed by extensive continental glaciation whose evidence has suggested that all five southern continents were joined to form Gondwanaland, the southern part of the primordial supercontinent Pangea.

During the early Mesozoic Era, Brazil was elevated above sea level and was subjected to erosion as South America and Africa began to split apart during the Jurassic period. This divergence of the South American and African global plates forced Brazil and the other parts of South America to begin drifting westward, colliding with the Pacific plate and producing an active subduction zone along the western side of South America. As the Pacific seafloor dove beneath drifting South America, rock and sediments were recycled at depth to be intruded into the upper crust forming the many grantic intrusions of the Andean mobile belt and also affecting parts of southern Brazil. Shallow seas covered sections of Brazil's Mesozoic lowlands producing thick sequences of sedimentary rocks and evaporites as the climate became more arid with the growth of the Andes. As the separate pieces of Gondwanaland continued to drift apart, the South American plate maintained its course to the northwest, overriding the Pacific plate.

In Cenozoic times, with cooling of the climate and intense precipitation during the Pleistocene epoch, sediments flooded the eastern lowlands with very thick accumulations, in part dammed by the faulting occurring when the earth's crust flexed east of the active Andean area. Thus, basins received thick accumulations of sediment resulting in the formation of extensive alluvial-filled basins. Rivers were subjected to intense runoff related to the glacial/pluvial climate. They were able to cut down into the sedimentary basins and carve out an extensive drainage system across the lowlands, and around the more resistant shield and intrusive areas. With continued uplift of the Andes, streamflow was ensured. The South American continent continued its migration into the tropics and equatorial regions as the push of an expanding South Atlantic seafloor forced South American up and over the descending Pacific plate.

The climate continues to change, affected by plate tectonics, latitude, the El Niño phenomenon, and global warming. Soils form and are washed away. Plants respond to soil and climate and, in turn, attract animals which feed on them and the prey the herbivores attract.

Brazil in Time and Place

Brazil is an emerging regional power in the South Atlantic (Becker, 1994), but there is an inherent ambivalence: there is advanced technology in Brazil but there is also poverty. There are television networks and these have linked isolated people. Brazil is a dynamic segment of the world economy; dynamic, because of its constantly-expanding frontiers. Since 1940, Brazil's gross national product (GNP) has increased seven per cent on the average.

The country is basically a continent and is fifth in size (area) of the world's nations. There are 19 to 20 inhabitants per square kilometer and, thus, the country has a potential for growth. Land ownership is the basis of power for dominant groups; there are 365 million hectares available. Brazil also has the greatest rainfall of Planet Earth, in the Amazon region. It has the oldest periphery of capitalist systems and this is the country, on the South American continent, where capitalism began.

Brazil produces and exports high-value merchandise, and has strong links with the main centers of accumulation in the world. There is free enterprise and there is a type of "slavery." Most of the labor force was close to subsistence in the past. Historically, the upper few per cent of the population control most of the income. Thus, Brazil is a rich country full of poor people.

Its territorial building is ahead of its national building. It was an "empire" for fifty years, in the past, based on coffee-growing and export. Now the states raise revenue through taxes and the state bureaucracy handles most of the organization.

Armed forces play a significant role in the country. Geopolitics is based on strategic positions: the Plata River of the south and the Amazon River of the north are of utmost importance. As part of the frontier development under the scheme of "marching to the west," Brasilia was constructed. National developmentism was commanded by state import-substitution.

Brazil's modernization was controlled by dominant groups. In the 1970s the country became a regional power. Abundant credit was extended by world banks (based on an excess of petroleum dollars). Brazil took more credit than it could support; there were high rates of investment by the military. Investment, in general, was based on a growth strategy: (1) there was national policy on a system for research to dominate the science and technology sector. This included design and construction of aircraft, and engineer-training. Also included were weapons (design and modernization by the army), nuclear development, and computers (design and applications by the navy). (2) There was considerable government spending. The banks lent money which was exchanged between the state and the international markets. The private/state bodies used the money to construct large blocks of infrastructure. (3) There was territorial strategic planning, similar to Russia, which included government-directed expansion of highways, energy, an urban network, and telecommunications. (4) There was a projection of Brazil into international political relations where Brazil's influence on the world could be felt (Brazil has the 8th largest GNP in the world). Brazil has constructed chemical, metal, mechanical (automobile), electronic, and agri-industrial complexes. It has moved from being an agricultural society to an industrialized society/country and to being important in export trade. It is becoming increasingly known for its input into international markets.

Urbanization has also increased rapidly from 30 per cent in the 1970s to 75 per cent in the 1990s. There are nine metropolitan areas with at least one million inhabitants. Brazil has diversified its exports and has intensified its relationship with Asia. South America, Africa, and the Middle East have large-scale engineering projects currently in progress. Brazil also has a cultural affinity with Portuguese Africa.

Sixty per cent of the Amazonian population lives in an urban environment and they are dependent on foreign technology. Most of the Brazilians are living in "modernized poverty" such as the small huts with television sets in the remote parts of the Amazon basin. These people are hungry for the benefits and services of the economic growth that they see, but do not have. They would be pleased to have better living conditions: more than half of the Brazilians are truly "poor."

A modern labor market is needed to support the country's growth. There are subsidies for agriculture to modernize, but this affects the large-scale farming operations, only. The small-scale farmer no longer works his own land. Coffee-growing, which was labor-intensive, has changed to soy beans that are mechanized, forcing the farm workers to become migrants and move about the country with the harvests. This has led to violence as the migrants saw what the rest of the population had.

Society is no longer striving for modernity; it has exhausted itself through social movements, crises, economics, individual territorialism, and "position. Thousands of people move into developed areas every night. Networks are built from which these people are excluded, leading to a type of civil war. This forced the beginning of organization and social movements: students fought the military role; the Catholic Church became involved. There is a Workers' Party, and there is the NGO (non-governmental organization). Brazil must now define the new role of the state to solve social problems and allow access to all areas of endeavor.

The Amazon, as a grand frontier, has absorbed increased migration. This region is using its natural resources and is strategically located for national security. Amazonia, in the interior of South America, exports its goods to the Atlantic, not the Pacific, region. There are social and ecological impacts: the Amazon is being pressured for "economic globalization. This is a matter of human survival and a symbol of challenge. Brazil's rich biodiversity is the greatest genetic reserve on earth. Here, biotechnology codifies "life.

Environmental Policy

Brazil's equivalent of the U.S. "Environmental Protection Agency" is I.B.A.M.A. (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis). It has a research center and botanical gardens, and conducts studies using remote sensing. It also oversees research on manatees and sea turtles (Lemos, 1994). There is a Ministry of Environment and a Ministry of Amazonia (Ministério de Meio Ambiente e dos Amazonia Legal).

In 1973, after the Stockholm conference, the "Special Secretary for the Environment" (S.E.M.) position was created. There was a national system for environmental control which oversaw the federal institutions. The states and municipalities also have their EPA-equivalents. I.B.A.M.A. is the executive arm governing use of environmental resources. This is linked to the Secretary for the Environment and includes environmental development, rubber, and fisheries institutes.

The National Commission for the Environment consists of 72 members. It is a powerful group that produces legislation on the environment, defines what constitutes "pollution," and other basic definitions; sets air pollution standards; regulates liquid discharge, forests, scientists, industry, agriculture, and labor.

The National Policy for the Environment (Política Nacional do Meio Ambiente) is supported with funds from the National Fund for the Environment formed in 1992, which receives moneys from the federal treasury and donor countries and agencies. A committee of five government representatives and three NGO (non-governmental organizations) representatives has received $30 million in three years. Of this money, 20 per cent goes to federal, state, and large municipalities and 80 per cent, to projects of NGOs and small municipalities (less than 120,000 inhabitants).

To stimulate action on the environment, the following was undertaken:

1. conservation units established
2. environmental education
3. environmental control
4. institutional-level strengthening
5. forestry and conservation of natural resources

IBAMA has 6,000 employees. Its interests include national forests and, also, creating public examinations to hire new personnel.

The National Policy includes environmental zoning. Ecologic and economic zoning started in the Amazon. The mineral deposit, Carajás, has the richest and largest iron ore deposit in the world. The known reserves of mineral resources are $1 trillion in the Amazon area, alone; in contrast, there is poor soil for agriculture. Zoning is being implemented to avoid mistakes in determining where agricultural projects might be started. Another question is how Brazil should preserve the Amazon forest and its biodiversity. Should it be preserved in its entirety? There were many prior mistakes in the Amazon area, but the Amazon cannot remain untouched. Brazil must use some of the "wealth" for the benefit of the country. However, environmental impact must be minimized.

The environmental policies and legislation permit system includes industries, land, mining, and oil extraction. This is at the federal and state levels and additionally has local impact. The types of permits are: (1) preliminary, (2) installation, and (3) operation. Policy-makers are trying to decentralize governmental rule, but the government has nationalized communication. There has been some follow-up of international conventions on the environment, especially with regard to sustainable development.

The "National Program for the Environment" has been in operation for three years and is funded with $166 million. This funding is distributed to governmental institutions to protect specific ecosystems such as the Panatanal, Atlantic Rainforest, Coastal-Zone management, cachinga, and Cerrado. Sixty million dollars of this has gone to a decentralized program where states, if they fulfill the necessary conditions, receive funds according to the state-government's priorities.

The majority of Brazil's population lives in the urban environment. There are huge problems there including sanitation, industrial pollution, and transportation. Some planning has continued but, in most of Brazil, new political parties do not continue with the previous party's policies. Not all funding should go to municipalities, only; there should be regional planning because of the migration of many people requiring more houses, jobs, and services. The National Program is now involved in the cities' current crises and little in the urban environmental planning program.

The World Bank has loaned Brazil $700 billion for water resources and that is the amount needed to just keep conditions as they are today; Brazil is unable to keep pace with the need.

Brazil is not at a sustainable level yet. Resource consumption is directly related to the amount of waste returned to the biosphere. In the future, the U.S. will discuss with Brazil the local consumptive patterns.

Amazonia

One-fifth of the world's supply of freshwater is contained within the Amazon drainage basin which houses the environmentally-threatened Amazon tropical rainforest. The 3,915-mile long Amazon River (also known upstream of Manaus as the "Solimões River") drains an area, from Cordilheira dos Andes to its mouth at Marajo Island, equivalent to half of the total area of South America within its 2,722,000 square-mile watershed. At 7,060,000 cubic feet per second, the river discharges at its mouth seven times the volume-discharge of the Mississippi River. This old-age river meanders through the forest at only 2 to 3 miles per hour, depending upon the floodwater volume. Often, from January to May, the river's elevation increases 40 feet as it spills across 30 to 40 miles of floodplain. During the dry season, islands emerge when the river drops to a width of 4 to 6 miles and has depth of 75 to 100 feet.

Manaus, the capital of the tropical State of Amazonas, sits on the left bank of the clear, dark Rio Negro at 3°10'S, 60°W. The Rio Negro rises in the highlands of Colombia and flows 1,860 miles to its confluence with the Amazon, just downstream from Manaus. The brown color of the Rio Negro's waters, due to decaying foliage and decomposing forest litter, contrasts with the turbid waters of the Amazon which carry one billion tons of Andean sediment each year. Due to differences in density, temperature, and chemical content, the rivers flow side-by-side for several miles below the "meeting of the waters before diffusing into one another.

"Paris of the Jungle," Manaus, is an old rubber boom-town that flourished for years before falling into disrepair after the rubber economy shifted to other continents. The rubber barons' lavish lifestyle is reflected in the older buildings and amenities originally established during this period.

In 1967 the Brazilian government established the Manuas Free Zone to attract commercial and industrial investment in the greater Manaus area. Here, foreign merchandise is also exempt from taxes. This incentive-inspired zone has once again become a boom-town of sorts for along with the duty-free zone have grown tourist hotels, and expanded electrical, communications, and water-supply systems. The industrial park houses such "nonpolluting" industry as electronic equipment, automobile and motorcycle manufacturing, and jewelry design and sales. This has taken place, in theory, as a "sustainable" development where it is believed that employment-development and environmental conservation can occur simultaneously.

Ecologic Areas

1. Lake Janauary Ecological Park: This is a 22,239-acre reserve on the Rio Negro. It consists of a forest with lakes and contains examples of igapó, terra firma, and varzea ecosystems. The Park is managed by a consortium of tourism firms.
2. Anavilhanas: This is a federally-protected 865,000-acre archipelago of 380 islands that emerge as floodwaters subside.
3. National Institute for Amazonian Research (IMPA): The Department of Aquatic Mammals in Manaus conducts research on many aspects of the local ecosystems such as manatees (Tichechus inuguis) and freshwater dolphins, including the well-known pink dolphin of the Amazon.
4. Other lands: Of questionable ownership, 111,600 square miles of biological reserves, ecological reserves, ecological stations, national forests, national parks, and protected areas are the responsibility of IBAMA.
5. Extractive reserves: These protected areas, about 30,000 square miles in area collectively, are managed sustainably by locals but owned by the Brazilian government. This supports managed development of the land by such extractive inhabitants as rubber tappers, farmers, Brazilnut gatherers, and babassu-palm nut extractors. In the Amazonian Extractive Preserve, there are 65 species of usable trees for every one hectare of rainforest habitat.

Amazon tropical rainforest

The State of Amazonas contains more than ½ million square miles of native forest of which about 1.25 per cent has been altered. There are 1½ to 2 million plant and animal species within this large ecosystem; approximately ½ million species have been studied and catalogued. At least 250 varieties of animals and 1,800 species of birds live in the riparian habitat. The tall tropical canopy contains trees that grow to 150 feet in height. Altogether these trees are estimated to produce 50 per cent of the world's supply of oxygen. The tropical rainforests are also of world import because 25 per cent of all pharmaceutical substances now used come from, or are based on, chemical compounds from these tropical forests which cover only 7 per cent of the earth's surface. Unfortunately, the annual rate of deforestation is approximately 5,790 square miles per year.

This complicated forest community consists of four separate types of ecosystem: the caatinga, igapó, terra firma, and varzea. The caatinga is found within the Rio Negro ecosystem in higher areas, around 340 feet in elevation, and receives an annual rainfall up to 158 inches per year. Sandy soil is leached by the rain and is of low fertility contributing to the relatively small height (20 to 60 feet) and diameter (8 to 10 inches) of the slender trees. Adapted to long periods of inundation, the species found in igapó forests grow along the banks of usually clear-water rivers. The slightly infertile soil hosts palms, woody shrubs, kapok trees (Ceiba petandra), samaumeiras, canatana, orirans and aninga.

From 200 to over 600 feet in elevation on undulating plateaus, the terra firma forms the boundary of the Amazon River Valley. This area is seldom flooded and supports harvestable hardwood trees along with up to 133 trees per hectare of species varying in number from 42 to 60. Periodically the soil of the varzeas is enriched by the deposition of nutrients from silt-laden waters that occurs during the flood season. The forests are very thick and quite tall. Cleared areas are cultivated for row crops such as corn, jute, and rice.

Deforestation

Deforestation is proceeding at a rapid pace: in 1991, land was cleared equivalent in area to the State of California. Historically, extensive cattle ranching was the primary cause of deforestation; today it is third in importance along with agriculture. Road building has cleared extremely large tracts of land and has opened up previously-inaccessible areas to clearing and development. Presently new federal highway construction has stopped in the Amazon. The roads serve as once the rivers did in providing avenues for transport of goods. Second in importance in deforesting land is gold-mining and timber extraction. The gold mines are short-lived and tailings are left

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behind as miners move on. Forests are renewable but only if replanted with similar trees.

Other uses to the detriment of the forests include the growing of cocoa, rubber, and forests for pulp production (eucalyptus); the harvest of corn, rice, soy beans, and sugar cane from cleared areas; reservoir construction; oil and gold exploration; and the production of charcoal.

The implications of deforestation are many: decrease in atmospheric oxygen content; increase in carbon dioxide emissions possibly contributing to global warming; disruption of the hydrologic cycle by increasing runoff and siltation while decreasing recharge and retention of freshwater; increase in rate of denudation; and, most importantly, a decrease in biodiveristy thereby affecting the gene pool of the entire planet.

Slides

1 through 5. Manaus has a busy port 1,000 miles inland from the South Atlantic Ocean. Many riverboats, large and small, carry passengers on local or extended trips upstream to Iquitos or downstream to Belém and beyond. Cruise ships also call-in on their way to and from the Caribbean Sea. Because of the fluctuating water levels of the Rio Negro, boats are tied up to floating docks constructed of concrete piers mounted on iron girders and help up by buoys.

6. In addition to the consumables and food brought to the Manaus markets, alongside the wharf fishermen call in daily to sell locally-caught fish varying from silvery perch to the large pirarucu.

7. Water hyacinth chokes the backwater areas where many people are crowded into boats without electricity, water, or a sewage system. They live their entire lives floating on the Rio Negro.

8. A part of Manaus is built on hills. Clinging to steep slopes are the slums, below which are houseboats and power boats. Raw sewage enters the river directly from these areas and this is also where water is used, untreated, for cooking and cleaning.

9. Containerized goods are brought by ship from worldwide ports to Manaus and then off-loaded onto barges for local distribution. This is a very efficient way to ship packaged goods.

10. Petrobãs oil refinery is on the banks of the Rio Negro. Brazilian oil is refined into various fractions and loaded onto oil tankers. This tanker is from Russia. Oil slicks commonly encircle ship-loading and other harbor areas.

11. River barges containing gasoline or diesel to power boats and ships create a floating "gas station" in the Amazon River. Fuel is pumped through hoses that are firmly attached to the intake ports on the ships and boats. There is a little direct spillage; most oil contamination enters the water through spillages washed off the deck to prevent fire hazards.

12. A wood-processing mill is high on the bank of the river. A "tailings pile of liquid slurry from wood pulp and sawdust drains untreated into the Amazon River. Also, some aerosols are discharged into the air. Nearby the Brahma-beer brewery uses Amazon River water in its processing of this popular beverage.

13. A small runabout enters the thick Amazon rainforest through a gap between the river and the inundated floodplain, called a "furo. Little sunlight penetrates the dense canopy of this jungle.

14. through 17. Inhabitants of the rainforest, downstream from Manaus, live on floating rafts in houseboat-like structures or in homes built on

stilts that have water lapping at the front door during high flood stage. The water is used for bathing and laundry on the steps of the abode. Raw sewage drops directly into the river.

18. through 20. As the river rises some 40 feet during the flooding period, most trees and shrubs are submerged with no apparent damage to the root system. This is the time when small canoes or dugouts are able to travel tens of miles across farm and pastureland, even over submerged fences, to visit areas for hunting and fishing that are far-removed from the main channel during low stages of the river.

21. The dense undercanopy contains many vines that are interwoven resembling shoelaces. Here clouds of insects hover over the water in the evening and early morning while iguanas sit high in the trees.

22. The Brazilian parrot lives in the upper parts of trees that inhabit small islands. They are most active in the twilight before sunrise.

23. through 26. As the waters rise, rather than walking, local inhabitants take to their canoes to reach the river where they can transfer to a larger shuttle that will take them to Manaus for the day's shopping.

27. through 31. In the filtered green light, it is possible to see snakes, birds, and fish where there is a silence reminiscent of many forests. The turbid Amazon River drops its load of silt among the submerged grasses and waterplants, and flows transparent under the trees.

Class Discussion Questions

1. Why are the Amazon rainforests being harvested?
2. American pharmaceutical companies are exploring the Amazon rainforest. Why?
3. Why is the Amazon River Basin important to the people of Amazonia?
4. Ecologists talk about "biodiversity." What is it and why is biodiversity in the Amazon of international concern?
5. How is the atmosphere affected by the Amazon rainforest?
6. What are Brazil's plans for the development of Amazonia? Does this conflict with the ideas the world has for preservation of the Amazon Region?

Belém

Situated almost on the equator (12°27'S, 48°30'W), Belém is the chief seaport of the Amazon region. This mango-tree shaded city of one million has a very humid, tropical climate with almost daily heavy rainfall attributed in part to its location only ninety miles inland from the warm surface waters of the South Atlantic Ocean. Once compared with some beautiful cities in France, Belém now has mildew-covered architecture covered with graffiti, many malodorous slums, and open trenches filled with sewage and refuse. This capital of the State of Pará seems forgotten and wasted.

Mist covers the tops of the tropical rainforest on the islands across from the city which is located on the southern bank of the Rio do Pará. This area, being part of the extensive subsiding Amazon delta region, has a tidal range of 3 to 6 feet and is subjected a tidal bore of up to ten feet in height, known as the "pororoca" (big roar), during the highest spring tides. As the seasonal deluge from higher elevations in the Amazon basin arrives, the wooded floodplain becomes inundated producing "varzea." Floating islands appear which are clumps of grasses that fall from undermined banks as the floodwaters arrive, and survive for months hydroponically, dangling roots into the turbid Pará and Amazon Rivers.

The many mud islands support luxuriant rainforest trees which serve as protection for the parrots and macaws of the area. A few houses on stilts dot the islands where locals fish for pirarucu (Arapaima gigas) a huge freshwater fish that grows up to ten feet in length and weighs up to 400 pounds. Common egrets (Egretta alba) and horned screamers (Anhina cornuta) are seen on the lower tree branches. The world's largest rodent, the capybara (Hydrochoerus hydrochaeris), feeds along the banks.

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Introduction

The purpose of this independent curriculum project, in part, is to fulfill the requirements set forth by the U.S. Department of Education for participants in the Fulbright-Hays Seminars Abroad Program, and, further, to provide teaching units that may be incorporated into the existing natural and environmental science curriculum.

The "Environmental Issues in Brazilian Society - 1994" Summer Seminar lasted over five weeks, June 26 to August 1, and included touring and studying selected areas of environmental concern throughout Brazil.

This paper contains an explanatory narrative and captions to slide sets for each section providing a framework for material to be presented to college- or high school-level science and general interest classes, adult education classes, and the college educational-television audience. Each unit contains information on the specific geographic area in Brazil, the general ecology and major environmental concerns. The sections may be used individually in half-hour segments with a laboratory, hands-on portion, and/or class discussion supplementing the illustrated lecture to roundout the 50-minute class. Also, the sections may be used to supplement existing units on geography, geology, environmental science and ecology, and oceanography. Pollution control and conservation are stressed.

It is the objective of this collection of teaching units to provide students with information on a continent and country far from North America that has similar environmental problems and human concerns. It is important to recognize that there is an environmental problem and that at least one other nation is formulating policy and acting to preserve its natural heritage.

General

Brazil is a land that brings forth mega-statistics when description is attempted: the fifth largest country in the world; the sixth most populous country in the world. It is larger in area than the continental United States and makes up one-half of the continent of South America, occupying 3.2 million square miles.

Sixty per cent of Brazil is covered by forests, and 3/5ths of the total area is occupied by the Amazon River basin, with 25,000 miles of navigable water, and the La Plata river basin. The country, itself, is fairly flat with 40 per cent around 650 feet in elevation.

The main physical features are a central plateau that varies between one and three thousand feet in elevation between São Paulo and Rio Grande do Sul. The plateau is crossed by two mountain ranges, one reaching over 9,000 feet in places; the other, averaging 4,000 feet.

The Amazon basin has the largest rainforest (Selva) in the world and supplies most of Brazil's timber, mainly tropical hardwoods. Eastern Brazil is covered with tropical and semi-deciduous forests, and soil of limited agricultural value due to leaching of nutrients. The southern highlands are extensive. Vast softwood forests are now in danger of extinction because of logging for construction timber. The northeastern interior is arid and sparsely vegetated due to low rainfall, over-grazing and excessive cultivation. Central Brazil comprises the States of Mato Grosso, Mato Grosso do Sul, and São Paulo. This area contains relatively infertile grasslands and scattered shrub, best suited for pasturelands.

Areas that are becoming destinations for ecotourism include the larger gateway cities and ecologically-important regions such as the Pantanal, known for exotic birds; the Great Escarpment, with huge plateaus and waterfalls; spectacular Iguaçu Falls; the rainforests of the Amazon, with outstanding birding and fishing; and the pine-clad summits of the southern mountains.

This varied country extends southward from the Amazonian equatorial plains at 4°N latitude to the cold uplands at 30°S latitude. All of Brazil is east of New York City's longitude: thus, western Brazil observes Eastern Standard Time; whereas, eastern Brazil is on Atlantic Standard Time.

Geology

Brazil, as a part of the ancient continental landmass that formed Gondwanaland, came into being at least two billion years ago. Two stable shields predominate in Brazil, the Guianan and the Brazilian, and represent the three rock groups (igneous, sedimentary, and metamorphic). These basement rocks have been covered by younger sediments and sedimentary rocks but continue to influence Brazil's topography having produced the Guiana Highlands of far northern Brazil, the Amazonian basin immediately south, and still farther to the south, the Brazilian Highlands (Planalto).

In Paleozoic times shallow seas invaded western South America and platform deposits formed in today's Amazon Basin. This activity was followed by extensive continental glaciation whose evidence has suggested that all five southern continents were joined to form Gondwanaland, the southern part of the primordial supercontinent Pangea.

During the early Mesozoic Era, Brazil was elevated above sea level and was subjected to erosion as South America and Africa began to split apart during the Jurassic period. This divergence of the South American and African global plates forced Brazil and the other parts of South America to begin drifting westward, colliding with the Pacific plate and producing an active subduction zone along the western side of South America. As the Pacific seafloor dove beneath drifting South America, rock and sediments were recycled at depth to be intruded into the upper crust forming the many grantic intrusions of the Andean mobile belt and also affecting parts of southern Brazil. Shallow seas covered sections of Brazil's Mesozoic lowlands producing thick sequences of sedimentary rocks and evaporites as the climate became more arid with the growth of the Andes. As the separate pieces of Gondwanaland continued to drift apart, the South American plate maintained its course to the northwest, overriding the Pacific plate.

In Cenozoic times, with cooling of the climate and intense precipitation during the Pleistocene epoch, sediments flooded the eastern lowlands with very thick accumulations, in part dammed by the faulting occurring when the earth's crust flexed east of the active Andean area. Thus, basins received thick accumulations of sediment resulting in the formation of extensive alluvial-filled basins. Rivers were subjected to intense runoff related to the glacial/pluvial climate. They were able to cut down into the sedimentary basins and carve out an extensive drainage system across the lowlands, and around the more resistant shield and intrusive areas. With continued uplift of the Andes, streamflow was ensured. The South American continent continued its migration into the tropics and equatorial regions as the push of an expanding South Atlantic seafloor forced South American up and over the descending Pacific plate.

The climate continues to change, affected by plate tectonics, latitude, the El Niño phenomenon, and global warming. Soils form and are washed away. Plants respond to soil and climate and, in turn, attract animals which feed on them and the prey the herbivores attract.

Brazil in Time and Place

Brazil is an emerging regional power in the South Atlantic (Becker, 1994), but there is an inherent ambivalence: there is advanced technology in Brazil but there is also poverty. There are television networks and these have linked isolated people. Brazil is a dynamic segment of the world economy; dynamic, because of its constantly-expanding frontiers. Since 1940, Brazil's gross national product (GNP) has increased seven per cent on the average.

The country is basically a continent and is fifth in size (area) of the world's nations. There are 19 to 20 inhabitants per square kilometer and, thus, the country has a potential for growth. Land ownership is the basis of power for dominant groups; there are 365 million hectares available. Brazil also has the greatest rainfall of Planet Earth, in the Amazon region. It has the oldest periphery of capitalist systems and this is the country, on the South American continent, where capitalism began.

Brazil produces and exports high-value merchandise, and has strong links with the main centers of accumulation in the world. There is free enterprise and there is a type of "slavery." Most of the labor force was close to subsistence in the past. Historically, the upper few per cent of the population control most of the income. Thus, Brazil is a rich country full of poor people.

Its territorial building is ahead of its national building. It was an "empire" for fifty years, in the past, based on coffee-growing and export. Now the states raise revenue through taxes and the state bureaucracy handles most of the organization.

Armed forces play a significant role in the country. Geopolitics is based on strategic positions: the Plata River of the south and the Amazon River of the north are of utmost importance. As part of the frontier development under the scheme of "marching to the west," Brasilia was constructed. National developmentism was commanded by state import-substitution.

Brazil's modernization was controlled by dominant groups. In the 1970s the country became a regional power. Abundant credit was extended by world banks (based on an excess of petroleum dollars): Brazil took more credit than

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it could support; there were high rates of investment by the military. Investment, in general, was based on a growth strategy: (1) there was national policy on a system for research to dominate the science and technology sector. This included design and construction of aircraft, and engineer-training. Also included were weapons (design and modernization by the army), nuclear development, and computers (design and applications by the navy). (2) There was considerable government spending. The banks lent money which was exchanged between the state and the international markets. The private/state bodies used the money to construct large blocks of infrastructure. (3) There was territorial strategic planning, similar to Russia, which included government-directed expansion of highways, energy, an urban network, and telecommunications. (4) There was a projection of Brazil into international political relations where Brazil's influence on the world could be felt (Brazil has the 8th largest GNP in the world). Brazil has constructed chemical, metal, mechanical (automobile), electronic, and agri-industrial complexes. It has moved from being an agricultural society to an industrialized society/country and to being important in export trade. It is becoming increasingly known for its input into international markets.

Urbanization has also increased rapidly from 30 per cent in the 1970s to 75 per cent in the 1990s. There are nine metropolitan areas with at least one million inhabitants. Brazil has diversified its exports and has intensified its relationship with Asia. South America, Africa, and the Middle East have large-scale engineering projects currently in progress. Brazil also has a cultural affinity with Portuguese Africa.

Sixty per cent of the Amazonian population lives in an urban environment and they are dependent on foreign technology. Most of the Brazilians are living in "modernized poverty" such as the small huts with television sets in the remote parts of the Amazon basin. These people are hungry for the benefits and services of the economic growth that they see, but do not have. They would be pleased to have better living conditions: more than half of the Brazilians are truly "poor."

A modern labor market is needed to support the country's growth." There are subsidies for agriculture to modernize, but this affects the large-scale farming operations, only. The small-scale farmer no longer works his own land. Coffee-growing, which was labor-intensive, has changed to soy beans that are mechanized, forcing the farm workers to become migrants and move about the country with the harvests. This has led to violence as the migrants saw what the rest of the population had.

Society is no longer striving for modernity; it has exhausted itself through social movements, crises, economics, individual territorialism, and position. Thousands of people move into developed areas every night. Networks are built from which these people are excluded, leading to a type of civil war. This forced the beginning of organization and social movements: students fought the military role; the Catholic Church became involved. There is a Workers' Party, and there is the NGO (non-governmental organization). Brazil must now define the new role of the state to solve social problems and allow access to all areas of endeavor.

The Amazon, as a grand frontier, has absorbed increased migration. This region is using its natural resources and is strategically located for national security. Amazonia, in the interior of South America, exports its goods to the Atlantic, not the Pacific, region. There are social and ecological impacts: the Amazon is being pressured for "economic globalization." This is a matter of human survival and a symbol of challenge. Brazil's rich biodiversity is the greatest genetic reserve on earth. Here, biotechnology codifies "life."

Environmental Policy

Brazil's equivalent of the U.S. "Environmental Protection Agency" is I.B.A.M.A. (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis). It has a research center and botanical gardens, and conducts studies using remote sensing. It also oversees research on manatees and sea turtles (Lemos, 1994). There is a Ministry of Environment and a Ministry of Amazonia (Ministério de Meio Ambiente e dos Amazonia Legal).

In 1973, after the Stockholm conference, the "Special Secretary for the Environment" (S.E.M.) position was created. There was a national system for environmental control which oversaw the federal institutions. The states and municipalities also have their EPA-equivalents. I.B.A.M.A. is the executive arm governing use of environmental resources. This is linked to the Secretary for the Environment and includes environmental development, rubber, and fisheries institutes.

The National Commission for the Environment consists of 72 members. It is a powerful group that produces legislation on the environment, defines what constitutes "pollution," and other basic definitions; sets air pollution standards; regulates liquid discharge, forests, scientists, industry, agriculture, and labor.

The National Policy for the Environment (Política Nacional do Meio Ambiente) is supported with funds from the National Fund for the Environment formed in 1992, which receives moneys from the federal treasury and donor countries and agencies. A committee of five government representatives and three NGO (non-governmental organizations) representatives has received $30 million in three years. Of this money, 20 per cent goes to federal, state, and large municipalities and 80 per cent, to projects of NGOs and small municipalities (less than 120,000 inhabitants).

To stimulate action on the environment, the following was undertaken:

1. conservation units established
2. environmental education
3. environmental control
4. institutional-level strengthening
5. forestry and conservation of natural resources

IBAMA has 6,000 employees. Its interests include national forests and, also, creating public examinations to hire new personnel.

The National Policy includes environmental zoning. Ecologic and economic zoning started in the Amazon. The mineral deposit, Carajás, has the richest and largest iron ore deposit in the world. The known reserves of mineral resources are $1 trillion in the Amazon area, alone; in contrast, there is poor soil for agriculture. Zoning is being implemented to avoid mistakes in determining where agricultural projects might be started. Another question is how Brazil should preserve the Amazon forest and its biodiversity. Should it be preserved in its entirety? There were many prior mistakes in the Amazon area, but the Amazon cannot remain untouched. Brazil must use some of the "wealth" for the benefit of the country. However, environmental impact must be minimized.

The environmental policies and legislation permit system includes industries, land, mining, and oil extraction. This is at the federal and state levels and additionally has local impact. The types of permits are: (1) preliminary, (2) installation, and (3) operation. Policy-makers are trying to decentralize governmental rule, but the government has nationalized communication. There has been some follow-up of international conventions on the environment, especially with regard to sustainable development.

The "National Program for the Environment" has been in operation for three years and is funded with $166 million. This funding is distributed to governmental institutions to protect specific ecosystems such as the Panatanal, Atlantic Rainforest, Coastal-Zone management, cachinga, and Cerrado. Sixty million dollars of this has gone to a decentralized program where states, if they fulfill the necessary conditions, receive funds according to the state-government's priorities.

The majority of Brazil's population lives in the urban environment. There are huge problems there including sanitation, industrial pollution, and transportation. Some planning has continued but, in most of Brazil, new political parties do not continue with the previous party's policies. Not all funding should go to municipalities, only; there should be regional planning because of the migration of many people requiring more houses, jobs, and services. The National Program is now involved in the cities' current crises and little in the urban environmental planning program.

The World Bank has loaned Brazil $700 billion for water resources and that is the amount needed to just keep conditions as they are today; Brazil is unable to keep pace with the need.

Brazil is not at a sustainable level yet. Resource consumption is directly related to the amount of waste returned to the biosphere. In the future, the U.S. will discuss with Brazil the local consumptive patterns.

Amazonia

One-fifth of the world's supply of freshwater is contained within the Amazon drainage basin which houses the environmentally-threatened Amazon tropical rainforest. The 3,915-mile long Amazon River (also known upstream of Manaus as the "Solimões River") drains an area, from Cordilheira dos Andes to its mouth at Marajo Island, equivalent to half of the total area of South America within its 2,722,000 square-mile watershed. At 7,060,000 cubic feet per second, the river discharges at its mouth seven times the volume-discharge of the Mississippi River. This old-age river meanders through the forest at only 2 to 3 miles per hour, depending upon the floodwater volume. Often, from January to May, the river's elevation increases 40 feet as it spills across 30 to 40 miles of floodplain. During the dry season, islands emerge when the river drops to a width of 4 to 6 miles and has depth of 75 to 100 feet.

Manaus, the capital of the tropical State of Amazonas, sits on the left bank of the clear, dark Rio Negro at 3°10'S, 60°W. The Rio Negro rises in the highlands of Colombia and flows 1,860 miles to its confluence with the Amazon, just downstream from Manaus. The brown color of the Rio Negro's waters, due to decaying foliage and decomposing forest litter, contrasts with the turbid waters of the Amazon which carry one billion tons of Andean sediment each year. Due to differences in density, temperature, and chemical content, the rivers flow side-by-side for several miles below the "meeting of the waters before diffusing into one another.

"Paris of the Jungle," Manaus, is an old rubber boom-town that flourished for years before falling into disrepair after the rubber economy shifted to other continents. The rubber barons' lavish lifestyle is reflected in the older buildings and amenities originally established during this period.

In 1967 the Brazilian government established the Manuas Free Zone to attract commercial and industrial investment in the greater Manaus area. Here, foreign merchandise is also exempt from taxes. This incentive-inspired zone has once again become a boom-town of sorts for along with the duty-free zone have grown tourist hotels, and expanded electrical, communications, and water-supply systems. The industrial park houses such "nonpolluting" industry as electronic equipment, automobile and motorcycle manufacturing, and jewelry design and sales. This has taken place, in theory, as a "sustainable" development where it is believed that employment-development and environmental conservation can occur simultaneously.

Ecologic Areas

1. Lake Janauary Ecological Park: This is a 22,239-acre reserve on the Rio Negro. It consists of a forest with lakes and contains examples of igapó, terra firma, and varzea ecosystems. The Park is managed by a consortium of tourism firms.
2. Anavilhanas: This is a federally-protected 865,000-acre archipelago of 380 islands that emerge as floodwaters subside.
3. National Institute for Amazonian Research (IMPA): The Department of Aquatic Mammals in Manaus conducts research on many aspects of the local ecosystems such as manatees (Tichechus inuguis) and freshwater dolphins, including the well-known pink dolphin of the Amazon.
4. Other lands: Of questionable ownership, 111,600 square miles of biological reserves, ecological reserves, ecological stations, national forests, national parks, and protected areas are the responsibility of IBAMA.
5. Extractive reserves: These protected areas, about 30,000 square miles in area collectively, are managed sustainably by locals but owned by the Brazilian government. This supports managed development of the land by such extractive inhabitants as rubber tappers, farmers, Brazilnut gatherers, and babassu-palm nut extractors. In the Amazonian Extractive Preserve, there are 65 species of usable trees for every one hectare of rainforest habitat.

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Deforestation is proceeding at a rapid pace: in 1991, land was cleared equivalent in area to the State of California. Historically, extensive cattle ranching was the primary cause of deforestation; today it is third in importance along with agriculture. Road building has cleared extremely large tracts of land and has opened up previously-inaccessible areas to clearing and development. Presently new federal highway construction has stopped in the Amazon. The roads serve as once the rivers did in providing avenues for transport of goods. Second in importance in deforesting land is gold-mining and timber extraction. The gold mines are short-lived and tailings are left behind as miners move on. Forests are renewable but only if replanted with similar trees.

Other uses to the detriment of the forests include the growing of cocoa, rubber, and forests for pulp production (eucalyptus); the harvest of corn, rice, soy beans, and sugar cane from cleared areas; reservoir construction; oil and gold exploration; and the production of charcoal.

The implications of deforestation are many: decrease in atmospheric oxygen content; increase in carbon dioxide emissions possibly contributing to global warming; disruption of the hydrologic cycle by increasing runoff and siltation while decreasing recharge and retention of freshwater; increase in rate of denudation; and, most importantly, a decrease in biodiveristy thereby affecting the gene pool of the entire planet.

Slides

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8. A part of Manaus is built on hills. Clinging to steep slopes are the slums, below which are houseboats and power boats. Raw sewage enters the river directly from these areas and this is also where water is used, untreated, for cooking and cleaning.

9. Containerized goods are brought by ship from worldwide ports to Manaus and then off-loaded onto barges for local distribution. This is a very efficient way to ship packaged goods.

10. Petrobãs oil refinery is on the banks of the Rio Negro. Brazilian oil is refined into various fractions and loaded onto oil tankers. This tanker is from Russia. Oil slicks commonly encircle ship-loading and other harbor areas.

11. River barges containing gasoline or diesel to power boats and ships create a floating "gas station" in the Amazon River. Fuel is pumped through hoses that are firmly attached to the intake ports on the ships and boats. There is a little direct spillage; most oil contamination enters the water through spillages washed off the deck to prevent fire hazards.

12. A wood-processing mill is high on the bank of the river. A "tailings pile of liquid slurry from wood pulp and sawdust drains untreated into the Amazon River. Also, some aerosols are discharged into the air. Nearby the Brahma-beer brewery uses Amazon River water in its processing of this popular beverage.

13. A small runabout enters the thick Amazon rainforest through a gap between the river and the inundated floodplain, called a "furo." Little sunlight penetrates the dense canopy of this jungle.

14. through 17. Inhabitants of the rainforest, downstream from Manaus, live on floating rafts in houseboat-like structures or in homes built on

stilts that have water lapping at the front door during high flood stage. The water is used for bathing and laundry on the steps of the abode. Raw sewage drops directly into the river.

18. through 20. As the river rises some 40 feet during the flooding period, most trees and shrubs are submerged with no apparent damage to the root system. This is the time when small canoes or dugouts are able to travel tens of miles across farm and pastureland, even over submerged fences, to visit areas for hunting and fishing that are far-removed from the main channel during low stages of the river.

21. The dense undercanopy contains many vines that are interwoven resembling shoelaces. Here clouds of insects hover over the water in the evening and early morning while iguanas sit high in the trees.

22. The Brazilian parrot lives in the upper parts of trees that inhabit small islands. They are most active in the twilight before sunrise.

23. through 26. As the waters rise, rather than walking, local inhabitants take to their canoes to reach the river where they can transfer to a larger shuttle that will take them to Manaus for the day's shopping.

27. through 31. In the filtered green light, it is possible to see snakes, birds, and fish where there is a silence reminiscent of many forests. The turbid Amazon River drops its load of silt among the submerged grasses and waterplants, and flows transparent under the trees.

Class Discussion Questions

1. Why are the Amazon rainforests being harvested?
2. American pharmaceutical companies are exploring the Amazon rainforest. Why?
3. Why is the Amazon River Basin important to the people of Amazonia?
4. Ecologists talk about "biodiversity." What is it and why is biodiversity in the Amazon of international concern?
5. How is the atmosphere affected by the Amazon rainforest?
6. What are Brazil's plans for the development of Amazonia? Does this conflict with the ideas the world has for preservation of the Amazon Region?

Belém

Situated almost on the equator (12°27'S, 48°30'W), Belém is the chief seaport of the Amazon region. This mango-tree shaded city of one million has a very humid, tropical climate with almost daily heavy rainfall attributed in part to its location only ninety miles inland from the warm surface waters of the South Atlantic Ocean. Once compared with some beautiful cities in France, Belém now has mildew-covered architecture covered with graffiti, many malodorous slums, and open trenches filled with sewage and refuse. This capital of the State of Pará seems forgotten and wasted.

Mist covers the tops of the tropical rainforest on the islands across from the city which is located on the southern bank of the Rio do Pará. This area, being part of the extensive subsiding Amazon delta region, has a tidal range of 3 to 6 feet and is subjected a tidal bore of up to ten feet in height, known as the "pororoca" (big roar), during the highest spring tides. As the seasonal deluge from higher elevations in the Amazon basin arrives, the wooded floodplain becomes inundated producing "varzea." Floating islands appear which are clumps of grasses that fall from undermined banks as the floodwaters arrive, and survive for months hydroponically, dangling roots into the turbid Pará and Amazon Rivers.

The many mud islands support luxuriant rainforest trees which serve as protection for the parrots and macaws of the area. A few houses on stilts dot the islands where locals fish for pirarucu (*Arapaima gigas*) a huge freshwater fish that grows up to ten feet in length and weighs up to 400 pounds. Common egrets (*Egretta alba*) and horned screamers (*Anhina cornuta*) are seen on the lower tree branches. The world's largest rodent, the capybara (*Hydrochoerus hydrochaeris*), feeds along the banks.

Slides

1. Southeast of Belém, between Carajás mine and the Amazon Basin, is the Araguaia River. This river rises in the Planalto Central and flows northward 1000 miles to become the tributary of the Toucantins River, also flowing to the north. The combined rivers join the Rio do Pará just southwest of the city of Belém. (aerial view)

2. The huge Tucuruí Dam and reservoir on the Araguaia and Tocantins Rivers, along with the Itaipú hydroelectric project, supply 90 per cent of Brazil's electricity. When fully operational, Tucuruí Dam will supply 7.7 million kilowatts. Rising water has drowned much of the vegetation and produced many islands within the reservoir. Dead trees dot the shorelines. (aerial view)

3. and 4. South of the broad coastal plain and huge southern Amazonian delta near Belém, are many meandering channels of old-age streams and reworked distributary channels. Blocks of cultivated land appear to support fruit trees. Red dirt roads have been cut through the scrub and forest. (aerial views)

5. The Rio do Pará slices through Amazonian tropical rainforest as it meanders towards Belém. This broad channel provides access to the inland areas of the State of Pará where few roads exist. (aerial view)

6. The southern bank of the Rio do Pará, cleared for the city of Belém, stands in marked contrast to the relatively unspoiled islands opposite the city. This is the gateway to the upper reaches of the Amazon drainage basin. (aerial view)

7. through 10. Parrot Island and other small rainforest-covered islands are home to few people and also are an important ecotourism spot. Many tropical birds leave their roosts in the early morning twilight hours to mate before flying towards the rising sun. The air filled with birds and their raucous calls is a sight worth seeing.

11. A close-up of the turbid Rio do Pará's water shows the murky-tan color typical of tropical rivers that carry suspended sediment and chemicals, such as tannic and humic acids, leached from the surface litter and soils of the forest.

12. Even though the area around Belém is ninety miles from the ocean, it experiences a semidiurnal tidal range of several feet. This leaves the thick mud of the shorelines exposed at low tide and produces some erosion due to boats' wakes. Vegetation appears to stand on long stalks at low tide.

13. Houses are perched on high ground on the mud islands across from Belém. Without electricity or a sewage system, waste is dumped into the river which is also used for drinking water, laundry, and bathing.

14. through 16. Small boats, canoes, and dugouts ply the waters carrying people and supplies to and from the city. All is calm until the great tidal bore comes churning through the region, ripping vegetation from the islands and gouging out the weak riverbanks.

17. and 18. The sumaumau (Ceiba pentandra), a tropical rainforest tree, is spectacular in its growth. Rising straight upward from a broad lower trunk and root system, its canopy towers more than 100 feet high, well above the rest of the vegetation. This provides habitat for some birds and monkeys, and also shade for the understory and the forest floor.

19. Although the waters of the Rio do Pará are brackish and experience tidal rise and fall, the water is too fresh to support mangrove swamps. People are able to drink this water without problems related to the salt content; the water also is used for limited vegetable gardens.

Class Discussion Questions

1. Belém is strategically located. Where and why is this city of great importance to Brazil?
2. What natural features and oceanographic processes occur in this area?
3. What natural resources are available to the inhabitants of the Amazon delta?
4. Ecotourism is developing in this region. What are the locales that would interest amateur ecologists, birdwatchers, etc.?
5. How could the city of Belém become more environmentally aware?

Bahía

In Bahía the State Environmental Council operates within the guidelines of environmental laws patterned after those of the USAs Environmental Protection Agency (EPA). Originally emphasizing pollution control, the role has changed through time to include social management with the emphasis on a citizen's right to his share of a relatively clean environment. The environment must be managed in a sustainable way and one way of doing this is to provide the means for citizens to pursue "public civil suites" against a party that is causing a harmful act upon the environment.

In the past, where there is such an amalgamation of racial types, religions, ideas on the use and preservation of the environment, the Bahián has had a nonconfrontational approach to life. But today the attitude and behavior have changed in the public and private sector; the state is responsible to the citizens and has mandates to protect environmental resources, the Polita de Desenvolvimento (policy of development). Strategic decisions now stress the economic value of the environment and emphasize that cultural assets should not have a deleterious effect on the natural environment. Studies ("environmental assessment impact") are conducted to ensure that the use of Bahía's soil is not irresponsible; attention is focused on the management and execution of development (planning to minimize the risk of environmental degradation). Are the developments and environmental impact acceptable to different sectors of society? Is the proposed development economically and biologically viable?

Bahían thoughts on the development of the environment involve (1) using technology to correct problems affecting people, (2) making corrections in management procedure, and (3) correcting human failure/mistakes. The government has adopted the strategy of ensuring total-quality programs, through coordination and inspection, and forcing penalties upon noncompliers. There is also a program to award bonuses to developments that are involved in correcting their environmentally-harmful actions.

The thrust in environmental administration is to proceed from no action to reacting to being receptive, followed by constructive thought and actions. Finally the goal is to become proactive, working with and for the preservation of a relatively unaltered environment. The state assesses a new development in terms of risk to the environment, the damage that would result form the project, and the norms against which the impact is measured. Is the risk inadmissible or a necessity, and is it manageable?

There is currently new legislation that is intended to stimulate those who succeed in creating environmentally-harmless developments rather than having the government rule by use of penalties against those who default. The state has begun to regulate new developments by enforcing the requirement that these entities register for operation with public authorities, by issuing licenses for operation, and by instigating environmental-quality auditing among companies and government, scientific, and educational institutions.

The Salvador Environmental Management Program consists of two phases: (1) diagnosis, via a database that is focused on planning and programs, and (2) environmental zoning, in which areas of environmental homogeneity are delineated and the city is regarded as an environmental system in its behavior (energy flow, sewage and water movement).

One aim is to couple systematic environmental monitoring with taxonomy" (classification) to produce an "environmental taxonomy." This is to include studies of soil, size, water resources, climate, and human population analyzed mathematically through multivariate statistical analysis in order to identify every possible aspect of the human environment. The intent is to delineate environmental homogeneity and interrelationships among the various factors. Thus, politics influence technical decisions which, in turn, affect environmental zoning. Wise decision-making should bring about the desired benefits to society and the natural environment, as well.

Salvador was founded in 1549 on a promotory overlooking a partially-enclosed gulf or bay with freshwater inflow from the land. The site gives good access to the north and south. For 200 years, in the 1700 and 1800s, flourishing sugar plantations were supported by good soil and fresh water. The city grew along the flat areas adjacent to the bay; the architecture was predominantly Portuguese. Now the old buildings are collapsing and creating environmental problems. North and northeast of Todos os Santos Bay, between 1930 and 1950, oil was exploited causing the rural atmosphere to become increasingly one of technology. These industrial activities brought in more people from outside Bahia and some of the Salvadorians moved north taking their polluting habits with them.

Petrobas is the main petrochemical complex in Camaçari, Bahía, and is located northeast of Salvador. At Petrobras, oil, titanium, and sewage enter the Bay from this complex and the rivers in the northeast receive lead and cellulose discharges. There are also breweries and textile plants. The northern beaches have serious environmental problems; whereas, the southern, are considered to be "clean."

Cetrel operates a wastewater treatment complex that has as its top priority pollution control through treatment of organic liquid effluents, burial of hazardous industrial solid waste, and incineration of chlorinated hydrocarbons and related compounds generated at these industrial sites.

Organic System and the Centralized Wastewater Treatment Plant

This collection and treatment scheme removes 90 per cent of the BOD (biochemical oxygen demand) load from liquid effluents high in organics, converting this material to sludge that is added to the soil for agricultural use (the Pronatura pilot program). The liquid portion of the effluent enters the Bay through a 1.7-mile pipe 98.4 feet deep.

Inorganic System

Effluent containing dissolved and suspended inorganic chemicals is collected, transported, and discharged through this system.

Incineration unit

A high-temperature incinerator burns organochlorinated liquids. Stack gases and particulates meet strict air pollution control standards.

Environmental effects

Scientific monitoring of liquid and gaseous components of waste from industrial complexes is rigorously followed. The quality of surface and ground water is analyzed along with air quality. Biological and physical characteristics of the local marine ecosystem are studied also to determine optimum timing for effluent discharge.

Slides

1. On Brazil's eastern coast just south of the "Northeast," lies the State of Bahia, between 10^0S and 16^0S latitudes comprising a 580-mile long coastline. North of the city of Salvador is the "restinga" consisting of vegetation that typically grows on sandy coastal plains between the salt spray of the South Atlantic beaches and the foothills to the west. (aerial view)

2. Along the north coast, sand has been transported to the south by the prevailing longshore drift to create narrow beaches and, depending on wave direction, beach cusps. Much garbage collects on the beaches, especially plastics. Local untreated sewage enters the surf zone through seepage often causing the sand to be coated with filamentous green algae. Inland the green line (Linha Verde) extends from Costa dos Coqueiros (Coconute Coast) at Mangue Seco State Park to Praia do Forte. This is a small, linear part of the Atlantic rainforest ecosystem. (aerial view)

3. Inland from the reddish sand beaches, are freshwater lakes and marshes within white sand dunes populated with sparse vegetation. A slight flow to the north slowly transports the water that is used for in situ bathing and laundry as well as serving as spotty local garbage dumpsites and fishing areas.

4. West of the duneline and running parallel to the ocean beach are lagoons fed by surface runoff, rainfall, and seepage of rainwater from 30-foot high sand dunes. The dunes provide sand for the higher sea turtle nests and also act as perched water tables supporting coconut palms and dune grasses on the crest. These stabilize the dunes to prevent their migration inland. Downslope are grama and eyperacean grasses. Surface seeps, garbage pits, and sewage contaminate parts of the local water table.

5. During the winter, huge swells from west African and Antarctic storms sweep along the beaches producing storm berms several feet high, and causing dune erosion at highest tides. Flotsam found in the wrack line consists of plastic bottles, rope, fishing lures, and assorted plastics. Some oil and tar balls also accumulate.

6. At Arembepe, narrow sandy beaches are swept by strong waves and littoral currents. Reefs exposed at low tide become temporary tidal pools.

7. Projeto TAMAR is a conservation program under the auspices of IBAMA (National Environmental Institute) that has set aside many miles of sandy beaches as sea turtle preserves where various species of these endangered reptiles are protected as they feed (áreas de alimentaçáo), breed and nest (áreas de reproduçāo). This program is supported by the Brazilian Government, the World Wildlife Federation, Tibras (Titanio do

Brasil SA), Camaçari, the Secretary of Tourism, and private donations (sale of T-shirts and other mementoes).

8. Sea turtles (tartarguas) copulate and internally incubate eggs for 15 days. They drag themselves ashore to build nests in the sand along the northeast coast of Bahía (Norte Litoral) from August to late March, usually around midnight. Often a false nest is built nearby. The eggs are laid in clutches and buried 10 to 14 inches deep.

9. Turtles hatch in 50 days. They are collected by scientists either digging them up or plucking them off the beach as they emerge from the nest. The turtles are placed in salt-water filled concrete tanks protected from the sun and birds by roofs, fed, and allowed to grow to one foot in diameter. They then enter the ocean in protected areas.

10. The Arembepe Preserve covers about 40 miles, from Farol de Itapúa to Guarajuba and has the largest concentration (20 per cent) of nesting sites on the Brazilian coast. In addition to being the largest reproduction site of Eretmochelys imbricata, additional species protected include: Caretta caretta (cabeçuda), Chelonia mydas (green sea turtle) and Lepidochelys olivaceà. The turtles pictured are approaching the size for release.

11. Sea turtles have been hunted in many countries for several centuries as a source of meat, oil, "tortoise-shell" for decorations, and for their eggs which are regarded as a delicacy. Confiscated skulls and shells of various species are on display in the Preserve's museum for visitors and school groups.

12. Salvador, also known locally as "Bahía," was the founding capital of Brazil and is said to be the second most-visited city in Brazil. The largest city in South America's Atlantic coast for hundreds of years, it also was host to Latin America's first American Consulate. Today's population is approaching three million inhabitants.

13. Human waste in this city's waters is generated by the high concentration of poverty-stricken people living on the hilly slopes where toilets and latrines discharge into narrow, open troughs that slope downhill to the more wealthy areas and the flatter parts of the city with contrasting economic development. Garbage also accumulates on the hillsides and rainwater leaches material which is carried downslope to the shore.

14. and 15. A name given to Salvador because of the slave-trading of the past, "Africa in America," is draped across a steep escarpment which divides the city into two levels and helps to confine the waters of Bahía de Todos os Santos. Salvador also has aesthetic resources in its Portuguese-style architecture of the old Upper City (Cidade Alta) with its large plazas and many elaborate churches.

16. and 17. The newer Lower City (Cidade Baixa) contains the office buildings, large landscaped parks, and tourist hotels that concentrate the population vertically. Salvador was built on a rocky promontory,

and this topography contrasts markedly with the sand beaches and dunes lying to the north and south. Although effluent enters along the shoreline, in the rocky areas facing the open South Atlantic Ocean, there is good mixing of water masses due to wave action and the presence of eddies associated with the East Brazilian Current.

18. and 19. Bahía de Todos os Santos is a shipping port and a fishing harbor. Bounded on the east by a breakwater and partially enclosed by fifty islands, pollution from ships and land-based effluent tend to concentrate within this Bay. Partially-treated effluent also is discharged from a pipe offshore in the hope that natural bacterial action will reduce the pathogens to harmless products.

20. Beyond the Mercado Modelo and Cidade Baixa many ships lie at anchor, discharging waste and garbage, and pumping their bilges. Tidal action transports some of this waste to the open ocean where it is diluted but often carried to distant beaches. The São Francisco River valley is the site of a hydroelectric project that provides power to northeastern Brazil.

Class Discussion Questions

1. How does the ethnicity of the population of Salvador compare with the rest of Brazil?
2. What is Bahía's environmental attitude as compared with São Paulo and Curitiba?
3. Does the locally-practiced variety of religions affect the manner in which Salvadorians view their environment in the city and ecology in general?
4. This is the second most-visited city in Brazil. What is the attraction?
5. Why is this area important for shipping and industry? What are the effects on the rivers, the Baía de Todos os Santos, and the adjacent South Atlantic Ocean?

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Carajás

The Serra dos Carajás in the State of Pará, ranging in elevation from 960 to 1,280 feet, consists of a series of rounded hills of ancient mafic rocks supporting a dense Amazon rainforest ecosystem on the slopes and in the valleys where there is an annual rainfall of 76 inches. Sparse semi-arid vegetation grows on the crests; it is the marked difference in vegetation which led to the discovery of the world's richest iron ore deposit.

Within the North and South portions of the Serra dos Carajás are hematitite/specularite deposits (formed by leaching of silica from jaspillite) containing red, enriched zones of high-grade ore that is 66 per cent iron in content and estimated to contain 18 billion tons. Also in this mineralized range are deposits of manganese and gold which are currently mined along with prospects of copper and nickel. Here, too, are bauxite (aluminum), chromite (chrome), and tin ores.

The Carajás Iron Ore Project of the Companhia Vale dos Rio Doce (CVRD), a part-government and part-private organization, operates the mining venture. Ore is processed into lump ore or for sinter-feed by running it through the beneficiation plant. The processed ore is then shipped via a 556-mile long railway to the Ponta de Madeira marine terminal in São Luis do Maranhão for loading onto ore carriers. Power for the mines, smelters, and electric train comes from the Tucurui Hydroelectric Project to the north.

Environment and Forest Products Superintendency

This superintendency oversees four areas of concern:

1. ecological and economic zoning - Over 700,000 hectares of rainforest are maintained and protected within the Serra dos Carajás.
2. protection for indigenous communities - The Parkatejē and Xicrin do Catetê tribal communities are provided land tenure, health services, and education.
3. hydrographic-basin recovery - Anti-erosion and soil conservation programs preserve the intergrity of the surface and ground-water regime.
4. green-belt development - Mining, milling, and transportation corridors are replanted by hydroseeding and other methods of reforestation.

Conservation

CVRD's area in Carajás measures 1,017,918 acres and also houses the Zoological-Botanical Gardens where research on the region's flora and fauna is carried out. Additionally, at this site is the zoological section where animals in natural settings are studied in an educational-zoo environment.

Three nearby IBAMA Reserves monitored by CVRD are: Tapirapé Biological Reserve (321,230 acres), Tapirapé/Aquiri National Forest (469,490 acres), and the Gelado Water Course Environmental Protection Area (53,374 acres).

Slides

1. The Carajás general installation encompasses a residential district of 6,000 inhabitants, a hotel, shops, a park, sections of untouched rainforest, schools, and a hospital.

2. The settlement of Carajás is within a partitioned-off area, protected from the untamed rainforest by a high chain-link fence topped with barbed wire. The town is clean, very orderly, and well-maintained. Water, sewer, and power are provided. There is bus transportation for workers, who wear color-coded clothes indicating their type of job. (aerial view)

3. The mineral deposits in the Serra Norte around the Carajás Mine include iron, manganese, copper, zinc, aluminum, nickel, tin, gold, antimony, silver, and molybdenum.

4. through 6. A panorama of the huge open pit of the N4-E mine at Carajás shows a J-shaped ore body 13,442 feet long by 984 feet wide and 1,312 feet deep. The benches are 48 feet high, and are periodically drilled and blasted toward the center of the mine (open face).

7. A schematic cross-section of the Carajás mine shows ore haulage and waste removal by very large trucks. The tailings are sent to dumps enclosed by dams; the ore is hauled to the beneficiation plant.

8. A specimen of ore shows the brilliant silver sparkle of a fresh piece of hematite (iron oxide) against a background of the more typical red hematite iron ore.

9. and 10. Electric shovels and front loaders lift the ore to the off-highway trucks. It is then transported to the beneficiation plant where it is reduced in size through primary- and secondary-crushing operations.

11. through 13. The ore is pulled by gravity through the mill and into screening, tertiary-crushing and -screening operations before dropping onto the conveyor belt and sent to the stockyard.

14. Beneficiation plants at mines are always located on hillsides to make full use of gravity's force in pulling the material through the various stages of ore processing, and into a final loading dock and haulage system. Red dust on the roads is kept wet by water trucks to lessen air pollution.

15. through 17. Processed ore is carried to the stockyard next to the railroad by a conveyor belt. The ore drops into each ore car as the train slowly moves. The railroad then carries the ore for 556 miles to the Ponta da Madeira port in São Marcos Bay where it is dumped onto conveyor belts and transported to the 3.6-million ton capacity storage

yard. As bulk-ore ships arrive, they are loaded directly from the storage yard.

18. and 19. Most of the very fine material is caught in a slurry which is processed before being discharged into a slurry pond near the railroad tracks.

20. Filtered of solids, the effluent runs into a long unlined channel, the Gelado Water Course Environmental Protection Area, and then to the tailings pond. Along the sides of the watercourse is dense jungle with many very large dead trees. The banks of the channel are red with iron oxides and the cleared area above the channel has been hydroseeded. The distal end of the tailings pond is used for swimming.

21. through 26. The Amazon rainforest caatinga is generally the type of rainforest that grows on the Serra do Carajás. Between Brasilia and Carajás the land changes from scrub and grass-covered plateau to an increasingly dense rainforest. Land cleared for agriculture is evident. Near Carajás, land is cleared up to the slopes of the mountains, where the nature reserves begin. The Serra do Carajás is an eroded series of flat-topped hills. In the valleys are high canopies of the rainforest.

27. There are four conservation units adjacent to the Carajás townsite and mine. These preserve forests and other ecosystems including riparian habitat of stream channels, as well as the lands of indigenous people.

28. At the Zoological-Botanical Gardens of Carajás are several laboratories that contain collections of herbs, insects and their nests, and butterflies. Collections for study of flora and fauna peculiar to the local rainforest are housed here. The goal is to preserve living species in their natural habitats in spite of localized development.

29. Mounted plant specimens are available for research.

30. Colonial-insect nests and insects, themselves, are studied to find their niche in the rainforest ecosystem.

31. and 32. Brilliantly-colored butterflies, whose populations are threatened because their wings are used to color jewelry and serving trays, are studied here. Preserved specimens of major lepidopteran species are in the archives.

33. through 35. Nurseries for bromeliads and other rare air plants are provided along with specimens of seedlings and saplings at the Botanical Gardens.

36. through 38. The Zoological Park is situated within the rainforest. Many Brazilian animals including panthers and monkeys live here in surroundings much more realistic than a typical zoo.

39. through 50. The threatened rainforest is more beautiful than imagined. Filtered sunlight slants through the trees illuminating spider webs and

forest litter. Vines entwine the tree trunks and the songs of birds echo through the forest. Twigs snap and the undergrowth rustles. This is a special place.

Class Discussion Questions

1. How is the settlement of Carajás special or unusual as compared to other cities and settlements in Brazil?
2. IS CVRD covering up its pollution from the eyes of international environmentalists and ecotourists? How? Why? Why not?
3. How was this mineral deposit discovered? Why is it here? What other economic minerals are here?
4. Describe the type of mine, the beneficiation plant, and the transportation system. Does this interfere with the rainforest?
5. This area has many mineral prospects that may be developed over the next decade. Should the international community have any say in what is happening to the natural setting here? Is there a market for the mined products? Is this area important in the general ecology of Brazil?
6. The company, CVRD, seems to be very environmentally-aware, with biological research being undertaken and many nature reserves set aside. What company politics possibly could be involved in presenting this 'concerned' face to international visitors?

Cerrado

In the central-west of Brazil an area occupying 22 per cent of the country's territory comprises the planalto central, a plateau averaging 3,000 feet above sea level. This two million square mile area supports an extension of the Amazon tropical rainforest in the northern parts and a forest and woodland savanna, known as "cerrado," to the south.

The cerrado has fertile soil that allows short grasses and stunted trees to grow in this semi-arid region that resembles West Texas or Eastern New Mexico. Part of this locale has been developed into large pasturelands and rangelands for cattle. Farms also inhabit the area; the world's largest soy bean farm is located in the cerrado.

Five geopolitical regions of Brazil meet in the central-west and serve to illustrate the interdependence of biological, physical, and cultural characteristics inherent in this part of Brazil. These regions are the Distrito Federal, the Cerrado, Rio Maranhão, Rio Preto, and Rio São Bartolomeu e Descoberto. The three major hydrographic regions which influence the biogeography and diversity of flora and fauna in this Neotropical area include the Tocantins, Paraná, and São Francisco drainage basins.

Brasilia - The capital of Brazil was set in the "center" of the country on the planalto central in order to open up this vast territory to development. Creating lakes and a city where nothing existed less than 40 years ago at least partially fulfilled the government's intent to develop Brazil's interior scrublands. Impressed with Brasilia's urban planning and spectacular architecture, UNESCO added this city to its List of World Heritage Sites in 1987. Located within greater Brasilia is the Brasilia National Park, an 81,049-acre reserve for local flora and fauna. The 1,483-acre botanical garden, on South Lake, displays local flora.

Among the many international and governmental organizations housed in Brasilia, there are several institutes conducting research of note: the Forest Products Laboratory (LPF), the Study Center for Bird Migration (CEMAVE), and the Remote Sensing Center (CSR). LPF specializes in forest products and wood technology. An interesting project involves finding substitute trees to be used in place of the rapidly-disappearing Amazon rainforest mahogany (Swietenia macrophilla). CEMAVA is involved in banding migrating birds in order to better study their habitats, distribution, feeding and mating habits. They focus on continental migratory birds, game birds, birds with nesting colonies, and endangered species of birds. CSR uses the techniques of remote sensing (satellite data) to survey, study, and monitor selected ecologically-sensitive areas of Brazil and to enter these into a GIS system for mapping detectable changes in various ecosystems, as viewed from space. Their research is mainly assessing the Amazon region, studying local desertification, mapping terrain and vegetation, and monitoring changes brought about by expanding human populations and industry.

Slides

1. and 2. The planalto central hosts scrublands alternating with farms and pasturelands. Near Cuiabá scrubland has given way to dirt roads, settlements, and extensive land clearing. (aerial views)

3. The Cuiabá River, choked with silt from land cultivation, meanders across part of the plateau and passes through the Pantanal. (aerial view)

4. through 6. A panorama of the edge of the planalto central escarpment looks toward the lowlands of the Pantanal. The grasses have few small trees in contrast to areas of lush jungle in the lower parts of the Cuiabá River floodplain.

7. Trees of the plateau become dormant during the dry season and shed their leaves to conserve water.

8. and 9. The edge of the erosional escarpment is composed of horizontal cross-bedded sandstones creating cliffs over which waterfalls plunge. Here Bridal Veil (Vella Noiva) waterfall drops into a dense microenvironmental rainforest similar to the Amazon rainforest to the north.

Class Discussion Questions

1. What is the topography and vegetation of this region?
2. Does the Cerrado have any use? For what?
3. Environmental degradation has already taken place here. Name the localities and the types of degradation. What can be done to alleviate some of the effects of the disturbances?
4. Are there any scenic spots within this region that could be advertised to increase the developing ecotourism industry?
5. Major rivers drain the Cerrado. Are they polluted? Why or why not?

Cuiabá

The geodesic center of South America, Cuiabá is located about 16°S, 56°W at the southernmost tip of the Amazon Basin and is several hundred feet in elevation on the Planalto Central. The Cuiabá River rises along the Amazon-Paraguay watershed in central Mato Grosso and joins the Rio Pequiri to the south continuing on its 300-mile braided course to the south-southwest to join the São Lourenço River, a tributary of the Rio Paraguai which is the boundary between Brazil and Paraguay.

The tropical savanna climate with 63 inches of annual rainfall (November to March) contributes to some of the flow of the Cuiabá River that supports navigation downstream of Cuiabá. In this area, there are many gold placers that have been mined-out, leaving huge pits of exposed earth.

Immigrants from Brazil's southeast have come to this region and brought with them the same farming techniques as they used along the coast. However, in such a different soil and climate type, these techniques have produced widescale soil erosion choking the upper reaches of the Cuiabá River. Where, in 1975 the river was over 300 feet wide, it is now only 15 to 30 feet wide; the soil from cultivation on local farms has formed islands of silt.

Class Discussion Questions

1. How has Cuiabá developed over the last 20 years? Is this for the better or worse, environmentally-speaking?
2. Cuiabá River flows through a part of the city. Is it polluted? Does it have an ecosystem worth studying and preserving?
3. Does Cuiabá pollute its environment? What steps are being taken to retain the developing-frontier atmosphere of the city?
4. Does what transpires here, ecologically, affect the rest of Brazil?
5. Is the rest of the world as interested in this area as it is in the rainforest ecosystems? Why or why not? Should the world be as concerned with the environmental degradation of the Cerrado as it is with other parts of Brazil?

Pantanal

Similar to the Mississippi River's delta in the way it "works," the Pantanal ("marshland") is a floodplain occupying a depression at the base of a slope that drops from the plateau in the north. Apparently this has been a structural depression since Tertiary times for it is filled with over 3,000 feet of quartzose sediment, mixed with soil derived from the chapada, on top of a crystalline or conglomerate bedrock.

The Pantanal covers 191,500 square miles along the borders of western Brazil, eastern Bolivia, and northeastern Paraguay. The rivers change course almost every twenty years. Presently 80 per cent of the Pantanal is within Brazilian territory and is privately owned. There is only one reserve of 50,000 acres. The entire hydrologic system has been affected by siltation, pesticides,and illegal placer-mining activities. In the past, where the vegetated areas had not been disturbed, the Cuiabá river's flow was only meters per day; with widescale disturbance of the watershed, the river now has a discharge measured in kilometers per day.

The floods averaging 15 feet in height, come from November through May and are a source of great fertility. As the land is inundated, salines and bogs form along with small hills ("cordilheiras") onto which wildlife crowds at floodtime. Often grouped together are jaguars, caimans, capybaras, and local cattle.

The birds of the Pantanal are spectacular. The tuiuiu, a five-foot tall jabiru stork (*Mycteria*), is the symbol of the Pantanal. Commonly seen are: macaca, hyacinthine macaws, parakeets, toucan, great egrets, bull-necked ibis, green kingfishers, crested catacara (falcons), wood storks (*Mycteria americana*), cocoi herons (*Andea cocoi*), roseate spoonbills (*Ajaia ajaja*), spotted-breasted woodpeckers (*Chrysoptilus punctigula*), and nearby, rheas. Also observed are white-necked herons, boat-billed herons, southern screamers (*Chauna torquata*), trogen, great black hawks, black-collared hawks, bat-falcons, black skimmers, and leaf-turners.

Other wildlife observed or heard include giant otters (*Pteronura brasileusis*), howler monkeys, capybaras, anteaters, and alligators.

The types of fish taken from the Cuiabá River are extensive including: pirambucu, jau, pintado, dourado, jurupoca, bagre, mandichorão, tuviva, pacu, pirputanga, papudinha, traira, curimbata, and piranha.

Although there is stronger flow with floodwaters, the turbid water has not dislodged much of the water hyacinth that chokes some channels. Occasionally clumps of hyacinth break off and drift downstream alongside the jacaré.

An environmental insult of major proportions is planned for the drainage basin that houses the Pantanal: the Hidrovia Project. A dredged and blasted waterway directly affecting more than a half-million square miles is planned to link the Paraguay/Paraná Rivers' drainage basins to the South Atlantic Ocean. The width, depth, and course of the rivers' channels will be disrupted in order to provide a straighter, wider, and deeper channel for ocean-going ships. Ancillary development is projected to include largescale increase in exportables, such as rainforest timber and various ores. Agriculture will also be encouraged by the government to develop new and larger pasturelands for cattle, and farms for sugar cane and soy beans.

Slides

1. through 4. The Planalto Central drainage contributes water to the Cuiabá River which flows southward through broad grass-covered fields and pasturelands. This land supports vast cattle ranches. Also seen are an occasional anteater, stork, and rhea. (aerial view)

5. During the dry season, home gardens in this area are parched and water is stored in tanks at roof level. Nearby are vast open-pit gold mines which was where the placer was mined by hand and the tailings transported manually.

6. The world's largest rodent, the capybara, is the size of a small dog. Groups of these mammals feed on vegetation along the course of the Cuiabá River.

7. Southern screamers (*Chauna torquata*) perch high in the trees.

8. and 9. Alligators inhabit sandy shores where they appear to be asleep and then slowly slither into the river if disturbed by nearby boats. Once food is sighted, they move at break-neck speeds throwing up a wake as they grab their prey and submerge.

10. and 11. Wood storks (*Mycteria americana*) have a wingspread of over 5 feet. They are heron-like in appearance and feed on small aquatic vertebrates.

12. Roseate spoonbills (*Ajaia ajaja*) inhabit the marshlands and roost high in the trees. They feed on small aquatic life.

13. Where the river flows more swiftly, the banks are higher (up to five feet above the river's surface at low flow) and consist of more resistant sediment. Here, tree roots stabilize the banks, and grasses and shrubs have a secure foothold.

14. Along the more sluggish parts of the river, water hyacinths have formed dense mats that provide habitat for fish and aquatic organisms but also impede boat traffic.

15. The cambará is a yellow-flowering tree that has a long straight trunk which is used for dugout canoes.

16. Kapok trees produce seed pods that open to expose long silky fibers used as stuffing for furniture and life vests. These trees commonly inhabit high ground in the marshlands.

17. through 19. The Pantanal consists of many meandering and anastamosing channels. With the rise of the river's surface to flood stage, erosion removes vegetation from the banks and islands; as floodwaters subside, silt is deposited, replenishing the land. Increased fertility encourages vegetation to grow rapidly and new seeds to germinate.

Class Discussion Questions

1. What is the topographic setting of the area? How was it formed?
2. This is a developing ecotourist destination. Why?
3. Briefly describe the ecology of the Pantanal. Are there endangered species along the river? In the river? On the adjacent plains?
4. How is the region being developed? Is this affecting the ecologic balance?
5. If you were going to the Pantanal as a tourist what would you look at? What would you photograph? Where would you stay? What would you eat? Would you be concerned with the insects and the pathogens they might carry?

Iguaçu Falls

Possibly the most spectacular natural feature in Brazil, Iguaçu Falls National Park was declared a UNESCO World Heritage Site in 1986. In the Brazilian side of the National Park are preserved 457,000 acres of subtropical (25°S, 55°W) rainforest and the animal life that inhabits it. The Argentine side of Iguaçu River has included within its National Park 136,000 acres. The river's headwaters are in the Serra do Mar east of Curitiba. From there the river flows westward for 820 miles to join the Paraná River below the falls.

Within the ecological preserve are found tachá (regional bird), quati (ring-tailed cat), panthers, anteaters, tapirs, deer, monkeys, macaws, toucans, and the common iguana. Nearer the falls are parrots, hawks, and dusky swifts. Flora representing many rare species are also protected here, including araucária, broad-leafed trees, epiphytes, orchids, pteridophytes, and bromeliads.

Slides

1. Located on the Planalto Meridional in the State of Paraná, the area encompassing the National Parks surrounding Iguaçu Falls supports a dense subtropical rainforest ecosystem. (aerial view)

2. Varying little in elevation (slightly less than 600 feet average), this plateau serves as the local base across which the Iguaçu and Paraná Rivers meander forming late-mature streams that eventually merge 12 miles to the west of the falls. These rivers, in turn, join with others draining Paraguay to become the Rio de la Plata that flows between Argentina and Uruguay eventually reaching the South Atlantic Ocean near Bahiauenos Aires. (aerial view)

3. and 4. The tropical forest that grows adjacent to the Iguaçu and Paraná Rivers receives abundant water from river-bottom seepage through the permeable sandy soil and from the 75 inches of rainfall and average humidity of 72%. Many islands of the volcanic rock, basalt, impede the flow of the rivers. (aerial views)

5. The Paraná River receives water from the plateau south of Brasilia and has a half dozen tributaries that empty their waters into it as the Paraná moves towards Lake Itaipú and the National Parks. Many unusual fish inhabit the river: jau, pintado, dourado, pacu, piaucu, and jurupoea. (aerial view)

6. Map view of the large meander in the Iguaçu River with its many rapids, waterfalls, and islands. Argentina is at the bottom of the map and Brazil is on the peninsular portion. On its sinuous journey to the southwest, the Iguaçu River receives discharges and seepages of urban, industrial, and agricultural pollution.

7. The islands of the Argentine/Brazil border support dense subtropical vegetation including broad-leafed trees, bromeliads, orchids, epiphytes, and pteridophytes. The sandy volcanic soil is periodically inundated during times of high runoff (January and February). As the water recedes, new sediment is deposited.

8. Rocks forming the lip of the precipices, over which as many as 275 waterfalls plunge, are pot-holed scoriaceous basalts dated at 120 million years. The waters of the Iguaçu are rather turbid due in part to runoff from agricultural activities, and humic and tannic acids from decomposing vegetation.

9. Plunging over the edge of a 1.8-mile long U-shaped precipice, Iguaçu Falls is the largest waterfall in the world in terms of discharge (volume-flow). Depending on season and rainfall, somewhere between 150 and 300 separate waterfalls drop into the river below.

10. On the Brazil side of the Iguaçu River, the falls vary in height from 130 to 260 feet. Mist bathes the vegetation helping to perpetuate the

rainforest species.

11. and 12. One of the highest individual falls is Garganta do Diablo (Devil's Gorge or Devil's Throat). Here fourteen separate falls merge, roaring down the face of a 350-foot cliff as seen from the Argentine stretch of the river.

13. A deep and relatively narrow channel leaves the area of the Cataratas do Iguaçu (cataracts) where the river has deepened its channel by down-cutting. Dense tropical rainforest crowds the walls of the lower gorge.

14. Macuco Falls is a separate part of the National Park and, at 60 feet in height, is smaller than the rest of the Iguaçu Falls. The volcanic lip responsible for the falls is easily seen. Blocks of rock dislodged by the force of the water are gradually broken down into river sediment.

Class Discussion Questions

1. Where do these waterfalls stand in relation to the great waterfalls of the world? How were they formed? Are they polluted?
2. Is the ecology being disturbed within the National Park? How? Is it evident to the tourists?
3. Describe the noise pollution of the area. Do you think this affects the wildlife?
4. Cities are spreading out around the Falls. How would this affect the quality of the air, water, and land of the rainforest around the Falls?
5. Three countries meet in this area: Brazil, Paraguay, and Argentina. What affect do they have on the ecosystems within the National Park? Is there international agreement on management of the park? What should it include?

Itaipú

Since its completion in 1983, the giant Itaipú Dam on the Paraná River along the Brazil-Paraguay border has been the world's largest hydroelectric project. It has 18 turbo-generators producing electricity equivalent to that from almost thirteen 1,000-megawatt coal-fired or nuclear power plants. This project was wholly financed by Brazil. Construction loans should be paid off by the year 2023. The scheme is owned by private electric companies and run by the Brazilian State of Paraná. Its income is $200 million per year.

With concern about protecting the environment as the Itaipú Binacional project was being constructed, studies were made of the soils, the climate, the water quality of the Paraná River and its tributaries, and agricultural activities. Habitats and animals' activities were studied in order to protect such species as mammals, snakes, reptiles, birds, and insects. In addition to archeological and historical research, thousands of plants were collected for specialized studies.

In phase I of the construction (1955), a diversion dam was completed to reroute the Paraná River in order to dry out the main channel for Itaipú Dam construction. Also during this phase scientists studied sediment transport and redistribution to predict sediment flux (movement of sand, silt, and clay) through the facility and downstream. The climate was studied along with regional atmospheric predictions for hydroelectric usage. More than 22 million cubic yards of rock were removed to provide a foundation for the dam; the rock and earth-filled parts of the dam constructed on the river banks required over 17 million cubic yards of material.

Twenty-seven miles of roads were constructed and 40 new bridges were built. Residents were resettled as the flood gates closed, the reservoir began filling, and the Itaipú Binacional project began. Trapped animals were rescued and taken to temporary havens. During the course of reservoir filling, 34,000 animals were captured. As the lake reached full pool, the animals were returned to wilderness areas.

Forest strips surrounding the river were planted for the protection of water quality by preventing soil erosion, for disease control, and for the protection of plant and animal species. As the area was resettled, vaccinations took place and sanitation facilities were built. Health education for the inhabitants warned them of cholera, malaria, shigella, and schistosomiasis. Buildings were sprayed with insecticides.

Itaipú was built with a multipurpose use in mind. The goals were to maintain water quality, fish populations, acceptable water chemistry, and aquatic vegetation. Of the 129 species of fish, some dwindled as others burgeoned.

For educating the public about the hydroelectric scheme and reducing the disturbance of local ecosystems, information was given on many subjects including the fishing potential of the reservoir. Specimens of local plants and animals were classified and placed in a museum of natural history and an ecomuseum. Also there was preservation/conservation of wildlife in the form of zoos. Environmental education was available for the local inhabitants and included public seminars on the environmental effects of the hydroelectric project. It has been important to stress the use of the reservoir for shipping using barges to carry agricultural products, for tourism and ecotourism, for nautical sports, and for fresh water for industry and agriculture.

Thirty miles away from Iguaçu Falls lies the artificial lake, Itaipú. Here Itaipú Binancional has many environmental programs to provide habitats and breeding programs for threatened species. Before and during the filling of Itaipú Lake (completed in 1982), animals were confined to 667 small islands. Also at this time, 12 million trees were planted in the area surrounding the dam in a huge reforestation project. Today several scientific study areas are available for public use and study.

1. Refugio Biologico Bela Vista

   At this Refuge indigenous animals are kept for breeding in protected cages. Monkeys, cats, and birds are protected in this zoo-like setting near the Lake.

2. Forestal Vivarium, Fauna, and Deforestation Sector

   Reptiles, mammals, and birds are bred and reared in captivity for later reintroduction into the rainforests. Plants are also grown here for reforestation projects near the Lake.

3. Projeto Expirmental Canal de Migração

   On gravel fill alongside the downstream portion of the Paraná River immediately south of the dam, a series of concrete fish-tank ramps, fish ladders," have been constructed. This permits the fish to migrate upstream to Itaipú Lake.

4. Ecomuseum

Studies and plots of specimens that have ecological significance to the Itaipú region are contained here. Information is exhibited on local archeology, botany, geology, and zoology. Social and ecological projects are also developed and studied at this education research center.

5. Biological Sanctuaries

The six biological sanctuaries located near Itaipú Lake are: Bela Vista, Santa Helena, Maracaju, Limoy, Itavo, and Itai-Yupi.

Slides

1. Map of the Itaipú-Binacional Dam scheme, and the Paraná and Iguaçu Rivers. This dam is the largest hydroelectric power plant in the world producing 12,600,000 kilowatts of electric power.

2. Cross-section of Itaipú Dam. The dam was constructed on solid bedrock in a deep channel of the Paraná River. The five-mile long dam is a mixture of earth-fill and rock-fill with concrete sections and facing.

3. The control room of Itaipú Dam. Operation of the hydroelectric plant requires a crew of engineers to monitor the various gauges recording water height and velocity through penstocks, on- and off-line turbines and generators, discharge over spillway, water volume and temperature, and leakage within the dam. Brazil receives 60 Hz AC electricity. Power is sent to Paraguay as DC and then converted to 50 Hz AC.

4. The downstream side of the dam is grass-covered earthfill at the distal ends. Because the earthfill part of the dam was constructed of impermeable materials at the core, leakage of reservoir water is minimal.

5. Reinforced concrete berms along the crest of the dam protect a two-lane road from wave erosion at high pool. To further reduce the possibility of erosion, rip-rap has been placed along the reservoir-side of the dam (upstream).

6. Large-diameter pipes (penstocks) carry water from higher elevations in the reservoir down to the turbines creating a hydraulic head. This potential energy is converted to kinetic energy; thus, falling water moves through nozzles to strike the blades of a turbine which turns a generator through a magnetic field creating hydroelectric power. The projected power-generation part of this scheme has a projected life of 160 years, until silt fills the reservoir up to the penstock intakes.

7. Discharge (up to 2,189,000 cubic feet/second) from hydroelectric generation produces a turbulent stream that causes local erosion, currents that are too strong for fish to swim against, and turbid (silty) water that affects stream benthos and nekton. No scientific studies have been conducted on the downstream reaches of the river. However, it was noted that the downstream water temperature is not noticeably different from the waters of the reservoir since the intakes are close to the lake's surface.

8. Protecto Experimental Canal de Migração has built a fish ladder to ensure that native species will be able to migrate upstream and beyond the large Itaipú Dam. There are eleven predominant species affected by this project.

9. The Paraná River flows downstream from the dam after leaving the penstocks and spillway. Such turbulent flow disrupts the riparian

habitat by increasing turbidity and disrupting the bottom and shores of the river. The water is known to contain pesticides and sewage, but it is not polluted by mining activity.

10. Itaipú Lake, a reservoir with a surface area of 521 square miles at an elevation of 738 feet above sea level, is the largest artificial lake in Brazil; the lake's width is up to 125 miles. The Paraná River has an average discharge of 353,000 cubic feet per second, and brings enough sediment into the reservoir that the projected useful life of the reservoir is 300 to, possibly, 1000 years. The lake's 38 billion cubic yards of water have inundated not only the original deep, narrow gorge of the Paraná River but also the lowlands that surrounded the stream's course. A "memorial" of the drowned waterfalls is planned.

11. Behind a locked fence is the Refugio Biológico Bela Vista wildlife breeding and rearing preserve. Many native species of mammals and birds are housed here where they are bred in captivity, and their young reared and reintroduced into habitats around the lake.

12. and 13. Members of the cat family are kept in separate pens until the females is willing to breed. The young are reared in captivity until they are able to survive in the wild.

14. The Reserve also houses exotic birds which are bred and which rear young that are later returned to the nearby rainforest preserves.

15. The Refuge is clean and well-maintained. The animals are provided with water and food appropriate to their natural dietary requirements.

16. through 18. Forestal Reforestation Sector. Tropical trees and herbaceous shrubs are raised here in seed beds and variously-sized containers. The plants are pruned, weeded, and watered until they reach a size where they can be transported and transplanted. To date over 69,000 acres have been planted with 20,000 saplings and seedlings.

19. At the lakeshore adjacent to the reforestation nursery is an aquaculture/hatchery project for growing native fish species in enclosed mesh cages that are emplaced fifty feet offshore. When maturing, these fish are released into Itaipú Lake to enhance fish populations and to make the fisheries sustainable for the local population as well as the occasional sports-fisherman.

20. Whereas on the Paraguay side of the Paraná River the tropical forests have been only slightly disturbed, on the Brazilian side the forests have been removed. In their place are sugarcane fields.

21. In an attempt to reintroduce the native rainforest shrubs and trees, seedlings and saplings are transplanted to areas cleared of the sugarcane. Sugarcane and grasses are on the left. To the right is a mixture of transplanted and reseeded vegetation.

22. After several years of growth, the native vegetation begins to grow faster than the exotics and their shade helps to stunt the growth of the non-natives.

23. and 24. Itaipú Binancional Ecomuseum. Many of Brazil's local rainforest shrubs and plants grow under controlled conditions at the ecomuseum. Visitors and students may walk through these study areas and view the stages of the growth.

Class Discussion and Questions

1. How does this hydroelectric scheme compare to those in other parts of the world? Why was it built?
2. How was the local ecology affected by the construction of the dam and filling of this reservoir?
3. How has this project affected the local community? Are there outreach/educational programs?
4. What is the project's organization doing as far as restoring the natural setting or lessening the environmental degradation that accompanies large-scale engineering projects such as this?
5. Are there programs to enhance the forests, plains, animal populations, and endangered vegetation? If so, what are they?

Volta Redonda and Companhia Siderúrgica Nacional

Brazil is the seventh largest steel producer in the world. The formerly government-operated Companhia Siderúrgica Nacional steel mill is located in Volta Redonda in the western part of Rio de Janeiro state sixty miles west-northwest of the city of Rio de Janeiro. Lying in the Paraíba River valley next to a major highway and railroad line, the steel mill has been in operation since 1947.

The privatized plant uses high-grade iron ore and alloys from Minas Gerais and coal from Santa Catarina. Hydroelectric power to run the plant is generated at the Ribeirão das Lagos site twenty miles to the southeast. The steel mill is continually adding new facilities; it has also received financial and technical aid from the United States.

Among the equipment housed in Volta Rendonda are a coke plant, blast furnaces, and open-hearth furnaces. Finishing mills produce rails, structural steel, and steel and tin plate.

Located in a valley frequented by coastal fog, Volta Redonda is subject to much air pollution in the form of acid mist and particulate matter.

Slides

1. through 3. Companhia Siderúrgica Nacional discharges steam and air pollutants into an often fog-filled valley. As morning fog clears, many stacks come into view.

4. and 5. The steel mill is situated alongside the main railroad line for ease in loading fabricated steel rails, plate, and tin plate. From here the products are taken to the coast for worldwide distribution.

Class Discussion Questions

1. Why was a steel mill located here?
2. What effect do the emissions from the steel mill have on the air and water of Volta Redonda?
3. Are there pollution controls presently in use?
4. How is the change of governmental to private ownership being handled? Are there problems? What interest does the international community demonstrate in this plant?
5. Should the steel mill be relocated? If so, where? Will it be necessary to 'depollute' this industrial site? Why? How?

Rio de Janeiro

One of the most beautiful cities in the world, Cidade Maravilhosa (marvelous city), surrounds Guanabara Bay and drapes over the Tijuca and Gávea Hills which are partially covered with the tropical vegetation of the Atlantic rainforest. Rio de Janeiro, located at 22°56S, 43°10'W, is a landlocked harbor of over nine million people, with a hot, humid climate and an annual rainfall of around 44 inches. Adding to its beauty are granite domes which thrust upward from the Carioca Range that traverses the city among which are the popular tourist destinations of Sugar Loaf Mountain (Pão de Acucar) and Corcovado Mountain with its prominent Christ statue.

But all is not as untainted as Rio appears: Guanabara Bay has become a cesspool receiving an estimated 1½ million tons of waste daily, including raw sewage from the city and the hillside favelas discharging into this deep harbor. The attractive island of Paquetá possesses inviting golden beaches of decomposed granite; however, water-contact sports may not be enjoyed here due to pollution. With its high population density, Rio also experiences traffic congestion and hazardous air pollution, noisy repairs and construction of buildings and streets, and a horrendous crime rate.

Nearby Tijuca National Park, the world's largest urban forest, contains little of the original Atlantic Coast Rainforest ecosystem (only eight per cent remains in the entire country of Brazil) that covered the hills less than a century ago. The land was completely cleared and later invaded by a secondary forest through which pour rapids and waterfalls. This area serves as an environmental example illustrating the fact that, if protective measures are not introduced too late, it is possible to restore nature to virtually its primordial state.

This area was originally cleared of trees which led to diminished water supplies, due to intense runoff during the wet season because of denuded land. Where there are no trees, shrubs, or grasses to protect the soil and allow water to slowly percolate into rock layers, the water immediately drains to the bays and ocean. Thus, Rio experienced a water shortage due to deforestation of the surrounding mountains. Later, sugar cane fields and coffee were grown on the slopes above the city but these were unable to retain sufficient water. The State of Rio de Janeiro is in charge of the reforestation project and protection of the Tijuca Forest. UNESCO has designated the Tijuca Forest as a Heritage of Mankind site.

The Tijuca Forest is a tropical-vegetation reserve situated on the slopes of Corcovado. The south side of the hill was cleared and subsequently was invaded by an African (exotic) grass that, when it turns yellow, is removed by burning. Along the hillside were planted tropical trees and some fruit trees. It is hoped that poachers will harvest the fruit and not the trees. Generally, trees are hauled upslope on racks on donkey- or mule-back. Each seedling arrives in a small black plastic tube from which it is removed for planting. It is placed in a small hole and given no additional water. The slopes are steep (more than 35°) and underlain by granite, producing a granular decomposed-granite residual soil, with clay at depth.

The Botanical Gardens (Jardin Botânico do Rio de Janeiro) covers 340 acres and contain 5,000 species of trees and 235,000 plants. The names of the living specimens are identified on plaques. The adjacent slopes have remnants of the tropical Atlantic rainforest; a few streams flow through the park. IBAMA's goals for the Gardens are to provide education, propagation of plant species, and conservation.

State-operated Pedra Branco forestry nursery is on the grounds of a dilapidated mental hospital near Gávea. The plan is to have the patients take care of the seedlings and saplings. Earthworms are cultivated as well as rows of seeds and plants in various stages of growth. The plants will be used to recreate an Atlantic Rainforest on nearby slopes.

Pedra Branca State Park covers 12,000 hectares on the lower slopes of a rounded granite dome covered with relatively dense rainforest. The Park has been landscaped, in part, and has a paved path rambling through a part of the forest. A visitor center sits perched amid the forest.

Also within the city limits of Rio de Janeiro is the Mandanha Forest situated between the western end of Rio and the town of Nova Iguaçu. The reforestation project in this area involves reintroducing Atlantic Rainforest species to the slopes. The forest will grow around an area watered by springs and serving as the headwaters of rivers that have their mouths at both Septiba and Guanabara Bays. Along the banks of the water courses, the Fluminense

Lowlands, reforestation will take place as will the construction of the Gericino-Mendanha Park.

Slides

1. through 4. Rising through folded sedimentary rocks near Rio de Janeiro are large granite domes whose slopes have soils thick enough to support large stands of reforested Atlantic-rainforest vegetation. Smog, often thick enough to produce first-stage alerts (hazardous-air warnings), creeps from the coastal plain far into the mountains affecting the survival of upslope vegetation. The slight gradient towards Guanabara Bay allows sewage and other wastewater to drain, untreated, into the bay.

5. through 9. The road from the Volta Redonda area (home of a large steel mill) down to the coastal plain passes through rolling grass-covered hills with pine-tree plantations and banana farms. Reservoirs dot the hills and sea breezes carry air pollutants far inland. The valleys support extensive row crops.

10. and 11. The slopes of the hills above this Rio favela is being reforested with seedlings propagated at the Pedra Branca nursery. Seedlings are planted in hand-dug holes following the hill's contours. Rains are the only source of water for these newly-introduced plants.

12. The reforested slopes will help to retard the flow of water allowing some water to recharge the ground-water reservoir and also to prevent soil creep.

13. and 14. On the north side of the hills surrounding the greater Rio area, thick secondary rainforest grows.

15. Raw sewage and trash are dumped into numerous channels throughout Rio's coastal plain. This material eventually reaches Guanabara Bay.

16. and 17. Pedra Branca forestry nursery occupies a small valley at the foot of granite hills. Water drains into the valley providing a warm, humid climate for plants raised here by the state.

18. At the Pedra Branca nursery is a "demonstration" building built of eucalyptus to illustrate that this wood may be used for construction. Eucalyptus is generally thought to be too soft and splintery for building.

19. Saplings are either planted in the soil or in five-gallon containers and are tended by patients.

20. The unsheltered seed beds are in long rows that are watered during the dry season and otherwise tended by volunteers.

21. Saplings ready for planting are lined up in containers. They are approximately 5 to 6 feet tall.

22. and 23. Another section of the Pedra Branca nursery has a shade screen to protect seedlings ready for transplanting. Each plant is housed in a small black plastic bag or container with peat moss.

24. through 28. The Green Coast, just west of greater Rio de Janeiro, is a protected area that continues from Rio to Parati and Septiba Bay. In this region of jungle-covered slopes punctuated by fishing villages and small bays is vegetation similar to that which covered Rio before development. The Tropical Islands area provides tourists with a view of relatively unspoiled Atlantic Rainforest vegetation.

Class Discussion Questions

1. This is the number one tourist destination in Brazil. Name five places/activities that would attract you, as an ecotourist, to this region.
2. What is being done to save the local rainforest? Can it be saved?
3. Guanabara Bay is highly polluted. Should it be cleaned up? How? Would this be an expensive project? Should the international community provide funding for the depolluting of the bay?
4. Air pollution is a big problem in Rio. What is being done about controlling the pollutants? What is their place of origin?
5. Since tourist dollars are important, and there are favelas and thieves, how would you protect yourself against disease and pickpockets when visiting this beautiful city?

São Paulo

The greater São Paulo area is home to 10 million people. Situated on a 2,700-foot high plateau at 23°33'S, 46°39'W, São Paulo has a temperate climate with a rainfall of 58 inches and an average annual temperature of 65°. The meandering Tietê River rises in the Serra do Mar of São Paulo state and flows northwestward 500 miles to join the Paraná River. This river which dissects the plateau has been drained and regulated, and is now heavily polluted. The city is also separated from the port at Santos by the great escarpment. In the western portion of São Paulo state the Aguapeí River, which has its headwaters in the western portion of São Paulo state west of Piraju, is 200 miles long and flows northwest also to become a tributary of the Paraná River. In this region are two main types of vegetation: the araucaria pine forests of the Paraná drainage basin and the tall-grass prairies of the Rio Grande do Sul.

The city, itself, is the center of the Third World's largest industrial park. Its population is made up of many different racial and ethnic groups; thus, there are differences in attitudes towards viewing the planet, its overpopulation, and its pollution.

Environmental problems are the same in São Paulo as in the other states; however, São Paulo has an awareness of an environmental problem and an ability to carry out programs designed to protect and enhance the environment. The area involved is similar to that of other developing nations. In terms of population, São Paulo is one of the largest cities in the world. Exploitation of natural resources is critical with 3.3 million square miles; there are eight different environmental areas within São Paulo.

"Biota" is a summation of people plus the environment. This is equivalent to an ecosystem. A "macroecosystem" is equivalent to people plus the land. There are groups of individuals within each macrocosystem. Previously there were no delineations because the environment does not have limits built into it.

There are six biomes:

1. Amazon Rainforest: tropical (the "Legal Amazon" is an administrative area that includes federal and state

subdivisions; there are other ecosystems in the Amazon besides the tropical rainforest).

2. Cerrado: plains, savanna; includes the central plateau and Brasilia.
3. Pantanal: a vast ecosystem; very similar to the Mississippi River.
4. Semi-arid ecosystem: the caatinga of the northeast
5. Atlantic Rainforest: colonization has just about annnihilated it; 95,000 square miles were destroyed and only 5 to 8 per cent of the original forest remains.
6. Estuarine/lacustrine/lagoons: along eastern São Paulo State is a 435-mile coastline; Brasil has 4,350 miles. São Paulo has the smallest variety of life forms. Here, there are araucarias and pines in the higher elevations creating an "umbrella" effect that is yet another microecosystem.

The São Paulo government is chiefly concerned with conservation, and control of pollution and environmental degradation.

There are 36 million inhabitants in São Paulo State and half are in the greater metropolitan area of the City of São Paulo. Within the city limits, itself, are 11 million inhabitants. This city also has the greatest concentration of industry in Brazil. One-tenth of the population inhabits one-thousandth of the landmass but 40 per cent of Brazil's industry is in metropolitan São Paulo.

Two important problems are people and industry:

1. demographic concentration - people from the northeast have accounted for 500,000/year added to the population over the past five years; there is a dispersal of people now. São Paulo has problems unknown in the U.S. including lack of sanitation, housing,and waste disposal.
2. industrial production - there is air, water, and land pollution. A state law was put into effect in 1976 and is now being used to enforce pollution standards. Industrial growth was uncontrolled and there was no planning. Industry's goal was to receive a quick return on its money with no investment in infrastructure. Industry showed no concern for natural resources or the local

environment.

There are forty cities with a population of 100,000 within the State of São Paulo. In the last ten years, there has been an attempt to locate industry in the state's interior in a planned industrial district. Industries will try to make use of raw materials in these districts.

Air pollution continues to be a major problem, especially from April through August when a thermal inversion concentrates sulfur dioxide (SO_2) emissions. The World Health Organization (WHO) has set an acceptable limit of 80 ppm (parts per million) for SO_2 emissions; São Paulo has reduced its SO_2 emissions to 40 ppm. Cars are the worst polluters. Twelve air quality "alerts," or preliminary warnings, have been declared due to air pollution. The 24- to 48-hour warnings are based on unacceptable concentrations of atmospheric carbon monoxide and particulates.

The State of São Paulo is focusing its energy on two basic concerns:

1. the nature of the natural resources, and
2. controlling degradation.

Special projects are underway for the Atlantic Rainforest, the coastal ecosystem, licensing for any cutting of trees, water-supply sources, and reforestation. There are 2,600 officers in the Forest Service that are based at 119 stations and police these forests. The greatest problem is the destruction of native forests, especially in the coastal areas. On the slopes of the Serra do Mar, from the plains to the coast, real estate speculation is taking place primarily by European investors. Along the southern São Paulo coastline, in Cibiara Valley, is a precious stretch of Atlantic Rainforest: here there is a rich biodiversity, caves, and palmettos. There is a great potential for medicines, furniture, food and clothing. Further, there are many international political questions on biodiversity. Among the highly-developed and developing nations, concern has been expressed about commercial copyright and U.S. patent rights.

There is a satellite program called the "Green Eye" project where, in only sixteen days, changes in the environment were recorded. Environmental planning includes coastal management, macro-zoning, geo-economic, and geo-ecological relationships. Cities are provided support in the form of financial compensation for not permitting some industries to locate there.

Particular industries are licensed in order to control their environmental impact. The states are responsible for streets and hydroelectric plants. Unfortunately, even though hydroelectric plants are major polluters, by tradition the states are not held accountable.

The State Environmental Council is made up of 36 members, 18 from governmental organizations and 18 who are private citizens representing industry and municipalities, the three state-supported universities' programs in science, a lawyers' association, and public defenders (six of this group are from private environmental organizations). A "green ombudsman" receives people's complaints on the first Monday of each month until midnight. The Forestry Foundation also supports technology and quality control.

Tietê Project - This river flows through São Paulo and receives 1,100 tons of polluting organic load mostly from household waste along with three tons of inorganic pollutants each day. The Tietê Project is a river-depollution program aimed at reducing the pollution load of the river. The river is to be deepened and channelized, and the industrial pollution discharges are scheduled to be curtailed gradually. Campaigns in the newspapers and on television show the progress being made on cleaning up the Tietê and Cabuçu de Cima Rivers.

Instituto Florestal - The government of So Paulo operates the Forestry Institute (Instituto Florestal) which administers programs for the conservation and production of the forests which cover three per cent of the state. The Instituto's aim is to preserve animal and plant species in danger of imminent extinction, and to provide the technology for sustainable production and reforestation. Conservation units include parks and nature reserves totaling 1,823,000 acres; experimental stations, demonstration forests, and forest service areas involved in the production of timber total 124 million acres.

Núcleo Pedra Grande, "Parque Estadual de Cantareira," was set aside to assure water reserves for the City of São Paulo. This forest is the habitat of many endangered species, and is one of the world's major areas of native tropical vegetation situated within a metropolitan area. Within its 19,274 acres are the remains of the Atlantic Rainforest and one of the richest areas of botanical diversity. Many trails leave the Núcleo Pedra Grande museum that sits next to an interesting treeless pegmatite-granite outcrop.

Paranapiacaba - The Reserva Biologia do alto da Serra de Paranapicaba is under the auspices of the Botanical Institute. Located along a crest of the Serra do Mar, this area receives approximately 160 inches of rain per year. Here, the Atlantic Rainforest grows in "layers" with distinctive species at various heights within the forest. From canopy to ground level, in descending order, are large trees, smaller trees and palms, bromeliads and orchids, herbs, ferns, lianas, mosses and lichens. Unfortunately, this forest is suffering from the effects of air pollution from Cubatão, and nocturnal poachers after hearts-of-palm who cut every palm in sight. Located at Paranapiacaba is a ranger's station, test plots, and an air-collection system for measuring the amount and type of pollutants in the air rising from Cubatão.

Slides

1. To the west of São Paulo the plateau has a rich soil supporting fields of wheat and other temperate-climate crops. In places, the land is irrigated; however, most of the cropland receives sufficient rainfall for growth. (aerial view)

2. Being the hub of concentrated industry, the 10-million inhabitant City of São Paulo is one of the largest in the world and, as such, has a threatening smog problem from stationary and transportation sources. (aerial view)

3. through 5. The city has spread out across an undulating plateau. High-rises alternate with residential areas. Favalas (slums) are interspersed throughout the city and are areas of accumulation of garbage, solid waste, and sewage. The slopes and drainage channels receive the bulk of the refuse.

6. There is regular garbage collection throughout Greater São Paulo which helps to control odor, insects, and rodents in addition to limiting the spread of disease.

7. Canals drain the city and are either lined with concrete or unlined. The unlined channels provide a recharge area for contaminated water, polluting some of the local drinking-water supplies. Industrial waste and local garbage find their way into the easily-accessed channels.

8. Street-sweepers in São Paulo are uniformed men with brooms and carts rather than mechanized streetsweepers. Since there is a continual accumulation of papers and other litter along the sidewalks and streets, this is job security for the many employees of the municipal waste district.

9. Some trucks haul wrapped papers or plastics to recycling stations.

10. The Tietê River project is an ambitious scheme to clean the pollution from this River which flows through the city, eventually entering the Paraná River. The plan is to "depollute" the River, and deepen and straighten its channel to improve streamflow.

11. Vast areas of native vegetation have been cleared for croplands. One of the largest crops is sugarcane most of which is processed for its alcohol content. "Alcool" is the alcohol-gasoline mix that is for sale at gasoline pumps throughout Brazil. The alcohol burns cleaner than pure gasoline and reduces air pollution besides decreasing the demand for foreign oil.

12. and 13. The Institute Florestal's headquarters, located on the edge of the Serra do Mar on the outskirts of São Paulo, is responsible for protecting the forest and its animal species. The Institute also promotes forest conservation and the sustainable use of forests. The

adjacent Parque Estadual da Cantareira offers a vantage point from which the rainforest and the city may be viewed.

14. São Paulo has the greatest concentration of industry in all of Latin America and that contributes greatly to air and water pollution.

15. through 17. The Serra do Mar generally has clouds or mist hanging along its crests helping to add to the 160 inches of rainfall per year. From a distance, the forest is lush and green; the effects of air pollution and poachers blends into the shadows.

18. The Reserva Biologia do alto da Serra de Paranapiacaba is located on a crest near the highly-polluted town of Cubatão. It is a forest that is heavily damaged by poachers and also subject to landslippage.

19. and 20. The effect of air pollutants reacting with dew on a leaf surface is to form sulfuric acid, among other chemical products, which burns the leaf turning it a dry reddish-brown. This weakens the plants and insects invade them more easily.

21. Around midnight, poachers enter the Reserve and cut all palms they see in order to harvest the upper part of the trunks where hearts-of-palm is found. They sell this gourmet food for $10/pound.

22. Many chopped trees, stumps, and fronds of palms are found throughout the Reserve after a night's poaching.

23. Palm seeds are also collected by poachers. Biologists use these in their reforestation projects on the Great Escarpment.

24. through 26. A variety of palm species are found in the Reserve: Geonoma, Astrocaryum aculeatissimum, and Bactris setosa.

27. Rain and mist trapped by the trees drips to the ground where it slowly infiltrates the forest litter and trickles downslope into small streams.

28. The warm, humid slopes of the Serra do Mar provide perfect habitat for ferns to grow in the shaded sections of the rainforest.

29. Because of air pollution killing the trees, and the trees dying and exposing bare slopes, slumps and earthflows occur throughout the reserve. These disrupt stream flow and expose bare slopes to further erosion producing local siltation.

30. At the highest part of the Reserve, adjacent to the rangers' lodging, are two air-pollution monitors which filter particulates from the air drifting in from Cubatão. Air samples are analyzed for particulate matter and toxic chemicals.

31. Here, too, is a test plot for various species of shrubs and trees.

32. Above São Paulo are several reservoirs for the storage of drinking

water. The Serra do Mar Atlantic Rainforest holds a tremendous amount of water.

33. through 36. On the road from São Paulo downslope to Volta Redonda are many hills planted with pine and eucalyptus forests. These are processed and turned into wood pulp. The Forestry Institute is promoting the use of eucalyptus for construction.

Class Discussion Questions

1. Describe the general appearance and ambiance of this huge city.
2. How does the air pollution here compare to Rio de Janeiro and Cubatão?
3. Why have so many industries congregated here at an inland site?
4. Describe the green belts. Why are they necessary? What is being done to expand their area, if anything?
5. How are the governments of the City of São Paulo and the State of São Paulo monitoring the environment? What studies relate to improving the environment?
6. Describe the Tietê River, its origins, its affect on riparian habits, and the project for depolluting the river.

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Cubatão

The air pollution capital of the world may well be Cubatão, a city of 90,000. The air in this heavily industrialized city contains twice the level of suspended particulate matter considered lethal by the World Health Organization. Essentially no birds or insects remain, many trees are blackened stumps, and more babies are born deformed here than anywhere in Latin America. Air pollution monitoring machines break down from contamination and parts of the city have had to be moved to areas of cleaner air and less potential for landslides.

Located at the foot of the Serra do Cubatão, a 2,600-foot coastal escarpment, and in low-cost swamp flatlands, Cubatão is subject to atmospheric inversion, fog, moderate rainfall, and a prevailing sea breeze, in addition to air pollutants. The area is the site of a hydroelectric plant that generates electricity for São Paulo and Santos, and also powers paper mills, chemical works, and an oil refinery. This small valley, altogether, houses 23 industrial complexes with a total of 110 manufacturing installations.

Developed in the 1950s with no environmental controls, the industrial site is now under some control and reclamation is taking place. Factories are monitored as is river and ground water. Effluent reaching the Bay of Santos' beaches is clean enough for water-contact sports. Here, pollution has been "halted" according to CETESB officials. However, a mushroom-shaped cloud hangs above the city. Air quality continues to require improvement. In 1983 the government started formulating air pollution emission and control policies. In two different areas the population continues to be at risk. After two air pollution disasters, where 100 people died due to chemical leakage, some of the population of Cubatão was relocated in cleaner areas. Cubatão is now recuperating and, with 90 per cent of the land reclaimed, only a little remains. Air pollution from industrial plants continues to exceed approved limits for ozone and particulate matter. Unfortunately, the state-operated industries and plants are the worst polluters.

Cubatão is in one of two separate air basins. The locality has environmental conditions such as mountains and inversion layers that help perpetuate poor air quality. Where there is no air emission-control, landfills affect drainages, chemicals are incinerated, and colored dusts rise into the air basin. The effect of industry producing dust and gas concentrations at the base of the hills, the smog forming ozone, and the ozone bleaching the chlorophyll in trees thereby stunting them is part of the cascade effect. There is no way to disperse the air pollution; the Atlantic Rainforest has been killed off. Dead trees cannot hold the soil of steep slopes; the rains come and the heavy soil slides downhill through rock chutes in man-induced landslides covering forests and homes below the upper smog line and dislodging toxic solid waste stored in pits at ground level.

Pollution-Control - The pollution-control program consists of three areas of concentration: (1) stringent pollution control, (2) technical support for studies of rivers and vegetation, and (3) environmental education and community participation, where the community is given all available information about pollution problems in order to have input into their destiny.

Among environmentally-targeted industries are INDAG rubber; fertilizers, which must meet CEPA standards; and a water-pollution control station. The Santa Rita cement plant puts dust (particulate matter) into the air; this has been reduced by using filters. Fertilizer production released NO_1 (nitrogen oxides) producing yellow fumes; this has also been alleviated through use of a scrubber system. Concrete cells have been constructed to store chemicals buried in the ground and ground-water sampling is conducted near the in-ground storage areas. The Brazilian oil refinery, Petrobras, installed hydrostatic/electrostatic precipitators to reduce emissions. Volatile liquid hydrocarbons, once stored in open tanks, are now trapped beneath roofs. Ammonia has been removed from discharge waters and oil is taken from effluents and retained for biologic digestion. Once again there are fish in the river and their health is being monitored. Landfill contains oil drums of industrial waste buried in pits. Presently cement is mixed with the liquid pollutants to prevent their migration through the soil. Chemical plants now treat the discharge waters to reduce pollution. Copebras, Brazil's copper-processing plant, seeded its grounds to make green areas that would demonstrate that the site was no longer a source of pollution. The public relations department proved the cleanliness of the area by constructing a country club on the former landfill site to show that it was not contaminated. Where in the past dry sulfur was stored in piles, it is now sprayed with liquid sulfur to form a skin thereby reducing sulfur emissions from the storage areas.

Water discharged from the steel mill undergoes treatment. Also the effluent from air pollutant scrubbers, which was another source of water pollution, currently has its own water-treatment facilities. Pollution control has been integrated to include earth/soil, water, and oil pollution problems. The mill had a dump alongside the river. Local citizens fought to have the dump moved to the sanitary landfill site. Of the many harmful chemicals in Cubatão's air, fluorides were reduced 92.4 per cent; hydrocarbons, 87.8 per cent; dust 72 per cent; and ammonia, 97 percent (sufficient so that the odor is no longer detectable). Malodorous emissions of hydrocarbons, hydrogen sulfide, and mercaptans are also no longer detected.

Sulfur dioxide (SO_2) emissions have been reduced 63 per cent by oxidizing them to sulfates but this pollutant also should be reduced. NO_x has been reduced 78.1 per cent; organic BOD in rivers, 93 per cent; metals, 97 per cent; and solid waste, 81 per cent.

State of São Paulo Park - Just outside the industrial area of Cubatão is a State of São Paulo Park. Within the reclaimed forest and scrub are deserted buildings remaining from a settlement that was forced to evacuate due to pollution and landslide potential. Across the stream that flows down the slopes of the escarpment and through the park, is a planted eucalyptus forest that was to be harvested for use as paper pulp. However, the State Park will not permit harvesting because of the landslides which may result from a cleared forest. The Nagoya (Japan) Orchid Society is working with the park to re-introduce native orchids to this area.

Reforestation of the Serra do Mar, and the resultant reduction in landslide potential, includes native vegetation planted on areas of active mass wasting (soil creep and landslides); saplings planted manually in the more accessible areas; aerial sowing, with seeds enclosed in a gelatin, over inaccessible areas of the escarpment; and a later reintroduction of Atlantic Rainforest climax species.

Class Discussion Questions

1. How does the setting of Cubatão contribute to its being the "most air-polluted city in the world" reputation?
2. Is the atmosphere clearing up? Why? How?
3. What effects has air pollution had on the vegetation, the hillsides, and the people?
4. Is it "right" for industry to so degrade the environment that human life is threatened? Why or why not?
5. What is the State doing about the pollution problem here? List seven pollutants and describe how each might be lessened through chemical or mechanical treatment of effluents, fumes, etc. How? Why? Are there environmental risks involved.

Santos

Brazil's largest and busiest seaport, Santos, is in the humid subtropics at 23°56'S, 46°21'W and is situated on coastal São Vicente Island, 33 miles southeast of the huge city of São Paulo. This port city, the State of São Paulo's second largest city, is reached by crossing a bridge from the mainland over a polluted tidal channel locally known as the "Santos River." Originally sited on a low marshy, mangrove swamp, with old-age tidal channels that meander from the foot of the Great Escarpment across a five-to-ten-mile wide coastal plain to Santos Bay, Santos has many waterways containing raw sewage, discarded papers and plastic. The ocean beach, the attractive part of the city, spreads along the seaward side of a barrier island of tightly-packed decomposed-granite sand. The beach has a very flat gradient so that well offshore the warm water is shallow and safe. In places filamentous green algae and sand "volcanoes" give evidence of sewage seeping directly from the many high-rise buildings lining the shore. Drainage channels built at right angles to the beach also discharge foul black, oily water to the sands. Every morning the beach is scraped and sifted by the City of Santos and the refuse collected is hauled away. On the shore and inland from Santos are several steep granite domes rising above the flat plain. This is where new light-industry is situated.

The harbor is very busy with large ships entering and leaving every ten or fifteen minutes during the daylight hours. Their black diesel smoke hangs low in the sky and, in their wake, trails oily slicks and refuse which eventually reaches the sunbathing areas.

Slides

1. The Atlantic Rainforest is evident along the Great Escarpment that separates the Planalto do Leste e Sudeste from the South Atlantic coastal plain.

2. This rainforest experiences cool winter temperatures and high precipitation along the higher mountain slopes of the Serra do Mar. Farther downslope, the trees grow to 50 feet in height and are surrounded with shrubby vegetation.

3. The southeastward-facing slopes of the Serra do Cubatão help to trap air pollutants rising from Cubatão that are carried northwestward by sea breezes. A whitish-blue cloud of pollution occurs at around 1,200 feet in elevation and contains chemicals that kill the native vegetation.

4. Water descends 2,578 feet through penstocks from a reservoir formed by the damming of tributaries of the Tieté River. Electricity is generated at the hydroelectric plant at the foot of the escarpment to power the industrial complex of Cubatão.

5. and 6. Steam and chemical vapors rise from the Cubatão industries where, depending upon atmospheric conditions, they may dissipate (slide 5) or concentrate (slide 6) producing a large noxious cloud that kills vegetation on the hillside eventually contributing to destructive landslides.

7. The lower hills to the southeast of Cubatão are bare, a result of clearing and toxic air pollution. Such bare slopes allow increased runoff producing localized flooding and soil erosion.

8. and 9. Weather conditions change rapidly as cool, continental air meets warm moist air from the ocean. Clouds form, droplets of acid rain occur, and the conditions necessary for a major air-pollution episode become a reality.

10. and 11. Such steep slopes are unstable especially as the added weight from rain-soaked soil helps overcome the stability and integrity of the slope. Slippages and landslides occur, leaving behind a scarred landscape carved into the rills of "badlands topography" typical of a polluted region.

12. and 13. On warm dry days with a land breeze, the Serra do Cubatão is quite attractive except for the thickening haze that creeps along the front of the escarpment as noon approaches. Then photochemical reactions take their toll on atmospheric transparency.

14. The State of São Paulo Park, just outside of Cubatão, is a small remnant of what was once a magnificent rainforest. Bromeliads grow

attached to trees and now flourish with improved quality.

15. Across a small river, within the park, is a planted eucalyptus forest that is maturing but will not be harvested for paper pulp because tree removal would create a potential for destructive landslides.

16. Within the State Park are the remains of homes that were left as residents moved because of the threat of a devastating landslide. Such mass wasting results from severe air pollution which caused the death of the trees.

17. and 18. The busy seaport of Santos was settled on an island at the edge of the ocean, beyond the mangrove swamps of the coastal plain. The busy city is polluted and foul-smelling effluent leaks into the bathing areas of the wide, inviting beaches.

19. and 20. Inland from Santos, along the roads to São Paulo where there are more stable soils derived from granite domes, light industry has taken hold and is expanding away from the unsuitable building sites the swamps offer.

Class Discussion Questions

1. Is Santos polluted? Where? Why or why not?
2. Why is this region important to the economy of Brazil? Why did a city start here?
3. What nearby areas should be preserved from degradation? Why?
4. Are there diseases here that might influence a tourist's decision to visit Santos? Is it safe to enjoy the beaches and swim in the bay?

Curitiba

Seven hundred year old Curitiba, the "ecologic capital of the world" as it is known in Brazil, occupies a shallow basin within the Planalto Meridional. Although the city is in the subtropics, near the Tropic of Capricorn, its elevation produces cool winter temperatures that favor the growth of native pine trees and cultivated wheat.

This very clean city's infrastructure, suffering under marked air pollution, gives evidence of well thought-out urban planning.

Curitiba's 1.6 million citizens are mostly of caucasian extraction and generally are living above the median in per capita annual income. There are no ghettos in this city: all types of buildings and neighborhoods intermingle. However, the industrial area is separate. Over the last few years, as the climate has changed, people involved in agriculture have migrated to the cities. This, along with problems associated with the local ideas on birth control, has added thousands to the congested city.

Surrounding Curitiba are many pastures and wheat fields where once coffee flourished. For some unexplained reason the climate has cooled and frosts have become much more of an agricultural problem: the coffee plantations have been replaced with less labor-intensive agriculture. Localized atmospheric inversion, very evident in the early morning, creates a blackish-brown smog with ribbons of black diesel fumes rising from the main thoroughfares. Currently there is a study of the city's air quality, especially as it relates to diesel smoke from buses and trucks, and from power-generation.

Although there is, on the average, one car for every two people, most ride the buses or walk to work during the week. There are also many city bicycle paths in use. Some of the city streets have been replaced by malls such as Rua das Flores and Garibaldi Mini Shopping. During the weekends, many cars are on the roads. Public transportation goes through all areas of the city in "transportation corridors." Passengers pay by token (about 40 cents) to enter a clear plastic "tube" bus station where they wait for the next bus. They board from the middle of the tube as deboarding passengers exit through the opposite end of the tube. This readily reduces boarding time for a faster, more efficient system. Eventually public transportation will be powered by electricity instead of diesel.

Only 40 percent of the population is on Curitiba's state-funded sewerage system. In the future the State of Paraná's various municipalities will have a closed sewage system rather than dumping raw sewage into open pits. Presently, the Iguaçu River is contaminated with human sewage and industrial effluent which leaves the city and flows inland eventually reaching the beautiful Iguaçu Falls. The World Bank and the State of Paraná have set aside $300 million for sanitation development. By 1995 or 1996, a majority of the households should be connected to the sewage system. On a more pleasant note, potable water is supplied by the state and is available in all parts of the city through a sophisticated water-distribution system.

Garbage collection takes place at night when trucks, carts and red-uniformed men invade the deserted streets to collect and transport plastic-wrapped discards. Garbage is separated into plastics, glass, paper, and metals (mostly aluminum). Such collection and disposal is both a private and city-funded enterprise. The city actually pays others to dispose of and recycle the city's waste. Seventy per cent of the population recycles. The city sells the recyclables to recycling plants and the proceeds are returned to the citizens through park construction and maintenance. The green garbage trucks haul trash from neighborhoods in the city two or three times a week. The State of Paraná is reluctant to become involved in solid waste and the red tape of policies, funding, building and dumping permits, adhering to the Quality Control Board, and other hampering politics. Curitiba's sanitary waste has limited space. There is also a "Green Seal" program for reduction in product packaging which should alleviate some of the solid waste. In the slums, garbage previously dumped on the hillsides has been removed and the hillsides planted with vegetable gardens. Bus tokens are used as "rewards" and this also helps to support the bus system.

Within Curitiba are "green areas" having a planned ratio of almost 60 square yards for every house in that part of the city. These areas, along with city parks, provide citizens space in which to pursue leisure activities.

At the Open University for the Environment (Universidade Livre do Meio Ambiente) in Curitiba, environmental-education teaching techniques are taught to primary and secondary schoolteachers. Mayor Jaime Lerner believes that environmental education must begin early to instill motivation. Also, the urban population is targeted by providing the opportunity for citizens to become informed in the importance of environmental issues that directly affect their living standards. Of particular interest is the melding of land-use and urban planning, and the knowledge acquired from completing local environmental projects. Each citizen is informed how he is directly influenced by environmental decisions regarding his city which, in turn, affects his standard of living. There are also on-going programs involving an environmental database and an exchange program among local, state, national and international environmental groups, and research on the urban environment. Among the courses being offered in 1994 are "marine mammals and coastal dunes of the South Coast," "a city and its environment," "introduction to landscapes and gardening," "construction strategies for an independent Latin America environmental science school," "tree-lined streets," "principles and practices of environmental education," and "creating green belts in cities."

By 1995, the Prefeitura de Curitiba (Prefect of Curitiba) will complete the eighth city park, Barigue Norte, along 26 miles of the Barigue River. Barigue Norte contains 1,700 million square yards of land. This park extends the parklands to a point where the river enters Curitiba near its boundary with the municipality of Almirante Tamanderé. Along the river margins are to be embankments and lakes to help preserve the river, and a statuary of Curitiba's pioneers. There will be benches, barbecues, playgrounds, birdcages, a snackbar and restrooms, areas for soccer and volleyball, an administrative structure, and a green belt for the preservation of significant shrubs. The older Igaçu Park houses botanic and zoologic gardens and has lakes that are a part of the city's water supply. There is a municipal guard station near the recreation areas for added security. The new park brings the total parklands of the prefect to 21 million square yards.

With four new parks, Barigue Norte, Tropeiros, Caiuá, and Diadema, altogether Curitiba has eight parks, seven municipal forests, 232 plazas, 245 small gardens, five environmental gardens, three sports centers, 14 zoos, and 16 landscaped boulevards totaling more than 100 million square yards.

Mayor Lerner started the Urban Planning Institute and is helping the citizenry to understand the need for establishing environmental controls and large-scale conservation. Each citizen is expected to help in preserving this part of Brazil. Quality control includes having public hearings with scientists in attendance and also interviewing departing airline passengers as to their impressions of Curitiba.

Slides

1. Curitiba, in the State of Paraná, lies within a basin in the Meridional Planalto. A local inversion layer trapping smoke along with agricultural burning and air pollution from transportation produces a thick blanket of photochemical smog over the city. (aerial view)

2. Beyond the city's outskirts, slash and burn clearing has removed almost all of the native forest which has been replaced by wheat fields and pastureland. (aerial view)

3. The city has many high-rise buildings intermingled with upper-class homes and favelas. Curitiba favelas are provided with electricity and running water but they are not part of the sewage-collection system.

4. Curitiba's wide avenues and large green belts favor expedient movement of mass transportation along aesthetically-pleasing strips of landscaping interlaced with sidewalks and bicycle trails.

5. and 6. City bus-stops are in the form of plastic tubes. Passengers enter at one end of the tube, pay for their transport with tokens, and board the bus from the center of the tube as other passengers exit the opposite end. This favors subway-style ingress and egress.

7. The slums (favelas) are intermingled with other residential and commercial areas. Hills piled with garbage have been converted to vegetable plots.

8. Mined-out rock quarries have been reclaimed for civic buildings. Locally the native forest has been allowed to reseed forming a greenbelt around areas which are used for education and civic events.

9. The city-supported Universidade Livre do Meio Ambiente (Open University for the Environment) provides courses on environmental education, gardening, environmental occupations, and ecological projects elsewhere in Brazil. This multi-storied wooden structure is built alongside one face of an abandoned quarry and houses lecture rooms, multipurpose rooms and a lookout platform providing a panorama of the reclaimed quarry, the greenbelt, and the Curitiba skyline.

10. Typical of other reclaimed quarries, the tree-shaded path leading to the Universidade Livre do Meio Ambiente passes a playground, out-buildings for public events, a small creek lined with ornamental shrubs, before opening out onto the wooden structure and adjacent quarry pond where waterfowl glide.

11. Along the rim of the reclaimed area are seen native tropical trees common in the low montane rainforest.

12. Typical of Curitiba's city parks, vast expanses of lawns surrounding sinuous lakes are punctuated by sculptures, playgrounds, and an arboretum. These green areas provide space for leisure activities with easy access to all.

13. The city's arboretum houses many tropical shrubs and bromeliads. Visitors may climb a spiral stairway to the upper balcony overlooking the greenery.

14. Sections of the park are forested with native trees such as the State of Paraná's symbol, the majestic aracauria.

15. Aracauria provide an attractive skyline at the edges of the park.

16. Throughout the city parks are areas set aside for public lectures and hands-on demonstrations of the unique natural environment of Curitiba.

17. A series of abandoned quarries has been reclaimed as partly-natural areas and partly-cultural. This quarry houses a large outdoor amphitheater and pond with an extensive graveled parking lot.

18. The Wire Opera House is a large spacious building with a walkway across a moat containing fish and a waterfall, and surrounded by tropical trees. Donations from private citizens worldwide helped to fund this project.

19. and 20. Green belts, reclaimed quarries, planted boulevard strips, and parks provide a pleasing contrast to the starkness of the city and the noise of the streets. Visual and noise pollution are just as important to combat as are the various chemical pollutants and environmentally-harmful ecologic imbalances.

Class Discussion Questions

1. Why is Curitiba known in Brazil as the "Ecology Capital of the World?
2. How are abandoned quarries reclaimed?
3. How does the city's politics affect the citizens' view of their environment?
4. Is the local University of the Environment accomplishing anything? What? How?
5. Should Curitiba be used as a model for the rest of the world to study as related to cleaning-up the environment and providing a pleasant place in which to live? Explain.
6. Why are parks and green belts important in cities?

Epilogue

The vast and virtually untouched territories of Brazil and the worldwide notoriety for its rapidly diminishing tropical rainforests are as well-known as its huge reserves of iron and manganese ores, gold, and gemstones, and its tropical flora and fauna. Brazil's population is expanding rapidly into areas previously protected by change. New settlements arise in Brazil's interior as people are drawn from the coast to the splendor and economic promise, Amazonia, Brasilia and environs hold.

Rainforest ecology is directly linked to Brazil's economic growth. With development of mining in remote areas and its dependence on hydroelectric power, also is the demand for workers and farmers to supply food from crops grown on soil cleared by slash-and-burn and left leached of nutrients by over-cultivation. Tailings and chemicals used in ore-concentration processes also take their toll on the landscape. Often drainage systems are polluted and new impoundments provide habitat for tropical disease. Thus, the land is laid bare and fauna forced to adapt, migrate, or die as the flora are ripped asunder.

Although jobs have been created through government-sponsored development of infrastructure and distant regions are developed through governmental support, pristine areas, the untapped natural resource, are opened up as other areas are depleted, perhaps leaving nothing for future generations. As a result, there are localized areas of decline in the standard of living. Urbanization is continuing at a rapid pace with intense industrialization, concentrated building, and government-sponsored educational institutions.

To the outside world, Brazil is *the* exporter of coffee, soy beans, and meat; it is also drawing foreign corporations to the rainforest to harvest exotic plants for pharmaceuticals. The issues presented to Brazil's voters include such environmental and conservation decisions as the clean-up of mine waste and waterways, the replanting of logged forests, the addition of fertilizers to leached soil, and immeasurable other remedies to mitigate the numerous insults to once-pristine land and water.

Are the national parks and wildlife reserves truly sufficient in number, area, and geographic distribution to preserve the unique Brazilian gene pool or is this an attempt to display Brazil's concern for its environment? Perhaps there are trade-offs here as in all conservation efforts: trading hundreds of square miles of destroyed ecosystem for a few select ecologic showcases mainly to promote ecotourism and world acceptance.

It is hoped that this material will impart to students, the television viewing audience, and the general public that we must not always think in terms of capital gain and work exploitation when weighing the effects of destroying virgin land and exterminating dwindling species of plants and animals. We must sacrifice to preserve our only home and to provide for its continued habitability; we must live in harmony with nature. Students will learn that there is more to life than acquiring money, land, and material goods; the aesthetics, the communication with nature, and the fact that we, too, are part of a giant ecosystem must color our very decision.

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